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THE ETHNOBOTANY OF THE WAORANI OF EASTERN ECUADOR

E. WADE DAVIS AND JAMES A. YOST*

Because of their intimate knowledge of plants, indigenous peoples of the Amazon have long had an essential role in the scientific search for new natural products. Today, with the tropical rain forest being destroyed at an alarming rate, and with the indigenous groups themselves facing acculturation or extinction, the modern world stands to lose a wealth of knowledge of unknown potential. The need for thorough ethnobotanical surveys is urgent. This paper presents the results of such a basic study conducted among the Waorani, one of the most recently contacted and vulnerable indigenous groups in South America.

The Waorani are a small group of 660 Indians whose traditional homeland covers some 8000 square miles of tropical wet forest south of the Rio Napo and north of the Rio Curaray between 76° W and 77° 30' W in eastern Ecuador. Generations of hostility between the Waorani and all outside groups have maintained these borders. The Waorani refer to outsiders as *cowode*

*Summer Institute of Linguistics
Dallas, Texas

and traditionally considered them cannibals, while most Ecuadorians know the Waorani as "*Auca*", a Quichua word meaning "savage." Mutual fear and contempt persisted for years and was characterized by killings on both sides, the most famous of which was the "Palm Beach Massacre" of five missionaries in 1956 (*New York Times*, Jan. 13, 1956). The first sustained peaceful contact did not occur until 1958 (Yost 1981b, Wallis, 1973). Ethnohistorical and linguistic data indicate that the Waorani have been isolated from even surrounding indigenous groups for many generations. To date, no linguistic congeners have been found and at the time of contact only two loan words could be identified in the Waorani language (Peeke, 1973).

Waorani social structure and settlement pattern contributed to their protracted isolation. Acephalous and highly egalitarian, Waorani political and social life are based on the kindred, a complex network of extended kin ties. The traditional Waorani settlement consisted usually of one or two long houses occupied by an extended family spanning three to four generations. Frequently, several other similar settlements closely related to the first settlement would be located within a half hour walk; this "neighborhood cluster" of several related settlements composed the community with which an individual identified throughout his life. Half a dozen such neighborhood clusters were distributed over a vast tract of rain forest isolated from one another by distance and fear. Never certain of exactly where the other communities were, the Waorani simply designated them as "upriver Waorani", "downriver Waorani," or "overland Waorani". This isolation within the territory reinforced a deep suspicion and hostility among the various Waorani groups, thereby functioning as both cause and effect of considerable intra-tribal warfare. Spearing raids were a constant feature of Waorani life and accounted for an astonishing 54% of male and 39% of female mortality. The perpetual blood feuds made the Waorani particularly adept in the forest; in the aftermath of the spearing raids, individuals were frequently forced to subsist for weeks on raw forest products alone.

Internal threats, however, were not the sole source influencing Waorani behavior and their dependence on the forest. The fear of

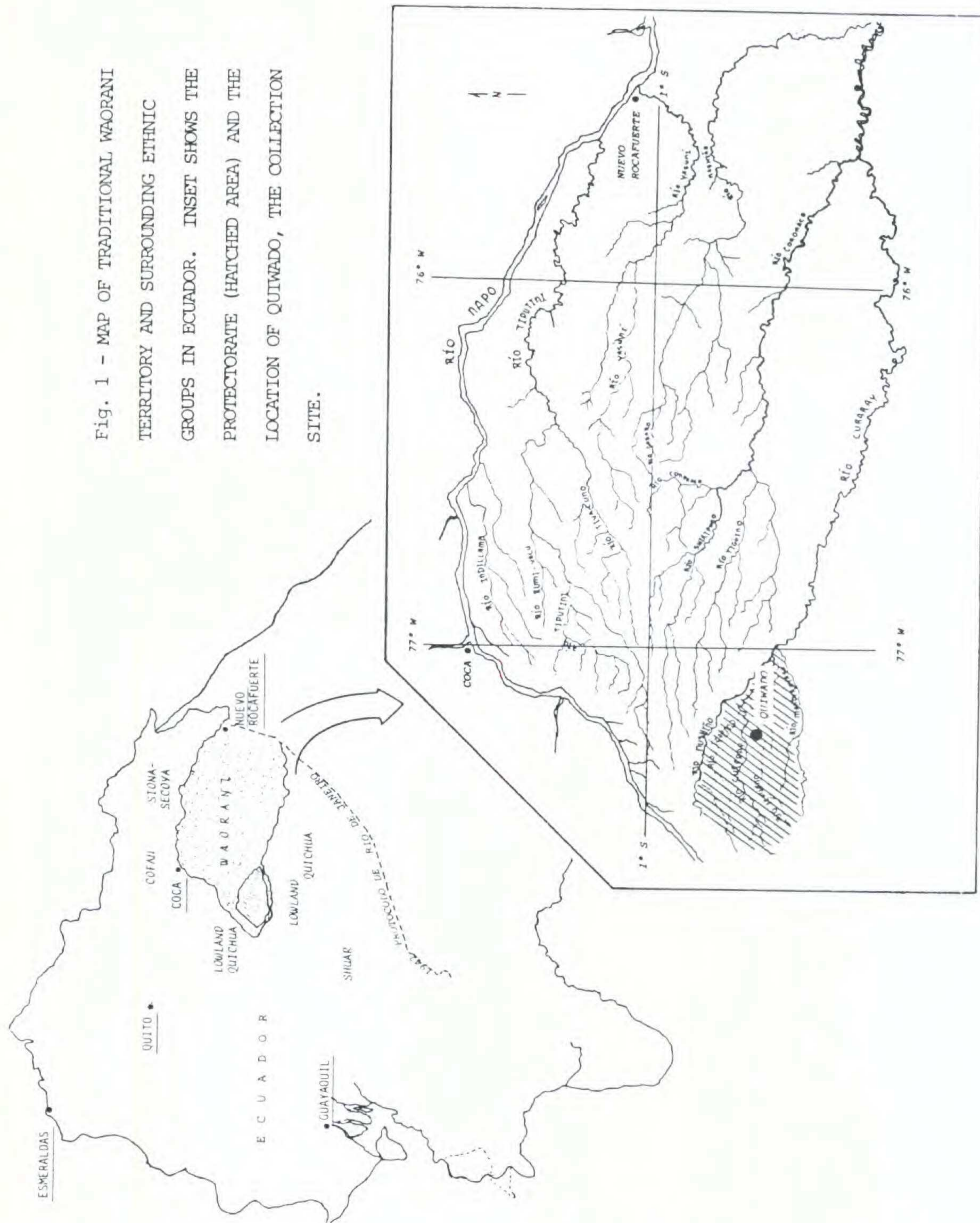


Fig. 1 - MAP OF TRADITIONAL WAORANI TERRITORY AND SURROUNDING ETHNIC GROUPS IN ECUADOR. INSET SHOWS THE PROTECTORATE (HATCHED AREA) AND THE LOCATION OF QUIWADO, THE COLLECTION SITE.

outsiders, or *cowode*, was a significant factor influencing the Waorani to settle on hillsides in the hinterland and deliberately to avoid all major rivers, which they considered the domain of *cowode*, such as the surrounding Lowland Quichua. As a result, the Waorani did not swim or use canoes, and their fishing was limited to the small feeder streams of the interfluvial forest. They considered the common Amazonian sources of protein, such as large catfish, water fowl and turtle eggs, to be taboo, and ate only a few of the fifty or more species of fish and numerous aquatic animals available to them. Although they maintain garden plots and derived a considerable amount of their carbohydrate intake from them, there is some evidence that agriculture came late (Yost, 1981a). Today, the Waorani still consider themselves people of the forest and derive most of their protein and virtually all of their minerals and vitamins from it.

Given the Waorani identification with the forest, both psychologically and cosmologically, and given their dependence upon the forest for much of their diet, it is not surprising that the Waorani are exceptionally skilled ecologists. The sophistication of their interpretation of biological relationships is demonstrated in their recognition and understanding of such conceptually complex phenomena as pollination and dispersal and in their understanding of the interdependence of animal and plant cycles, which enables them accurately to predict animal behavior. They anticipate the flowering and fruiting cycles of edible forest plants and know not only what species most forest animals prefer to feed on, but what part of the plant and in what stage of development they prefer it.

This intimate knowledge of the forest ecology, together with their long isolation as a people, make the Waorani an ideal group for ethnobotanical investigation. Based on interviews with the Waorani and on nine years of experience with them, we estimate that we have collected approximately 80% of the plants known to be used by the Waorani. Our data show a surprising dearth of medicinal plants (cf. Davis and Yost, in press), a peculiar use of hallucinogens and a particularly high utilization of wild foods.

Biomedical studies done at the time of contact or shortly thereafter describe a remarkably healthy people with very minimal problems with epidemic disease, internal parasites or bacterial

infections (Larrick *et al.* 1979; Kaplan *et al.* 1980). The Waorani were afflicted by external parasites, fungal infections, poor dentition and undefined fevers as well as one of the highest rates of snakebite in the world (Theakston *et al.* 1981; Larrick Larrick *et al.* 1978). For each of these conditions, the Waorani had herbal remedies, but it is particularly noteworthy that almost the entire Waorani pharmacopoeia treats only the few endemic afflictions readily identified by extensive biomedical studies. Only 35 of the plants that we collected are used medicinally, and, of these, 30 are employed to treat no more than six conditions: fungal infections, snakebite, dental problems, fevers, tropical warble fly larvae (*Dermatobius hominus*), and various stings. By comparison, Pinkley collected 57 medicinal plants from the neighboring Cofán, and those plants were used to treat 27 different ailments (Pinkley 1973). We have discussed this highly specialized use of medicinal plants and the theoretical implications of Waorani ethnomedical practices elsewhere (Davis and Yost, in press).

Throughout the northwest Amazon, hallucinogenic plants are an important feature of religious life. The Waorani use hallucinogens, but the species employed and the associated ritual are peculiar. The Waorani have two hallucinogens, *Banisteriopsis muricata* (Cav.) Cuatrecasas and an as yet undescribed basidiolichen of the genus *Dictyonema*. The former is morphologically very similar to other commonly used psychoactive species such as ayahuasca, *Banisteriopsis Caapi* (Spr. ex Griseb.) Morton, but it has never been studied pharmacologically (García-Barriga, 1975). On the other hand, no basidiolichen has yet been reported as an hallucinogen. According to some Waorani, an infusion prepared from the lichen and various mosses caused severe headaches and confusion when ingested and was used by a shaman to send a curse on a person to kill him or her. In comparison with the practices of other Amazonian tribes the Waorani use of hallucinogens is clearly anomolous. While others imbibe hallucinogens to fulfill the collective needs of the group, the Waorani intoxication may be characterised as aggressive, anti-social and highly individualistic (Davis and Yost, in press).

A final point worth noting concerning Waorani ethnobotany is the extensive use of wild food plants. After a year among the Kofan, Pinkley reported 24 wild foods and 25 cultivated or semi-

cultivated dooryard plants, a number of which were commonly introduced species that the Waorani do not grow (Pickley, 1973). The Waorani specimens include no fewer than 44 regularly eaten wild foods and only 19 cultivated or semi-cultivated plants.

In the following compilation, the families of vascular plants are arranged according to the Engler and Prantl system; and the genera are arranged alphabetically under the families. The lower plants are in alphabetical order by family. Complete sets of voucher specimens have been deposited at the Economic Herbarium of Oakes Ames of Harvard University and the herbarium of the Universidad Católica, Quito, Ecuador. All collections were made by Davis and Yost in the environs of the clearing of Quiwdo, near the confluence of the Rios Quawado and Tiwaeno (77° 14'W, 1° 50'S) in eastern Ecuador. The collection numbers are those of E.W. Davis.

To aid future investigators, our collecting assistants have been identified by name, sex and sub-dialect. In some instances, once a plant was collected, a variety of informants, representing all of the three major subdialects, were interviewed to verify the plant's use. As an aid to approximating pronunciation of the vernacular names, we have used a modified phonemic orthography easily followed by the non-linguist. Consonants are pronounced as in Spanish. Vowels are pronounced as follows: "a" pronounced as in English *father*, "ɛ" as in *cat*, "i" as in *meat*, "e" as in *pin* or *hit*, "o" as in *hope*, *shoe* or *put*, and "ng" as in *sing* or *hanger*. If a vowel be written twice in succession, it is held for a longer duration. Vowels contiguous to nasal consonants are nasalized. Other vowels may be nasalized as well, but they are not so marked here. For a complete description see Peeke (1973).

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TABLE I

List of Waorani Useful Plants

PLANTS USED AS TECHNOLOGY

Bambusa sp.	Gramineae	Ooña
Setaria vulpiseta	Gramineae	Gage
Undetermined	Gramineae	Yémingo
Astrocaryum Chambira	Palmae	Oopogencawé

Bactris sp.	Palmae	Iica
Bactris Gasipaes	Palmae	Tewe
Geonoma sp.	Palmae	Mo
Geonoma sp.	Palmae	Tedeñowencabo
Geonoma sp.	Palmae	Oomawe
Jessenia Bataua	Palmae	Petowe
Maximiliana Maripa	Palmae	Oompa
Socratea exorrhiza	Palmae	Yedemo
Wettinia guinaria	Palmae	Cayewebewe
Undetermined	Palmae	Tepa
Undetermined	Palmae	Giyicabemo
Undetermined	Palmae	Omacabo
Cyclanthus sp.	Cyclanthaceae	Wino
Heteropsis sp.	Araceae	Otome
Calathea Standieyi	Maranthaceae	Oyoncabo
Ischnosiphon obliquus	Maranthaceae	Gayaquewencagi
Selenipedium sp.	Orchidaceae	Meñegagowe
Ficus maxima	Moraceae	Corotamo
Minquartia guianensis	Bignoniaceae	Cobacadewe
Perebea guianensis	Moraceae	Bataca
Curarea tecunaru	Menispermaceae	Oonta
Enterolobium sp.	Leguminosae	Compago
Lonchocarpus Nicou var. Urucu	Leguminosae	Meneco
Undetermined	Leguminosae	Acowe
Picramnia Spruceana	Simaroubaceae	Degintai gipenii
Picramnia sp.	Simaroubaceae	Degintai gipenii
Gossypium barbadense	Malvaceae	Dayo
Ceiba pentandra	Bombacaceae	Bobewe
Souroubea sp.	Marcgraviaceae	Oonta
Vismia sp.	Guttiferae	Gacamenewe
Tovomita sp.	Guttiferae	Gingamonca
Bixa Orellana	Bixaceae	Caca
Carpotroche longifolia	Flacourticea	Nonginca
Calyptanthus plicata	Myrtaceae	Cowadewe
Clavija sp.	Theophrastaceae	Namontaqui
Brunfelsia grandiflora ssp. Schultesii	Solanaceae	Wiñemecawe
Crescentia Cujete	Bignoniaceae	Owewe
Ruellia colerata	Acanthaceae	Ewemoya
Alibertia cf. edulis	Rubiaceae	Owecawe
Simira sp.	Rubiaceae	Wepeta
Clibadium asperum	Compositae	Cooñei
Minquartia guianensis	Olacaceae	Cobacadewe
Undetermined	—	Anawenta
Undetermined	—	Omeogo
Undetermined	—	Winca

CULTIVATED PLANTS

Zea Mays	Graminae	Cagingo
Dioscorea trifida	Dioscoreaceae	Cowango
Musa paradisiaca	Musaceae	Peene
Arachis hypogaea	Leguminosae	Coromo
Lonchocarpus Nicou var. languidus	Leguminosae	Compago
Pachyrhizus angulatus	Leguminosae	Capamo
Manihot esculenta	Euphorbiaceae	Ouwe
Gossypium barbadense	Malvaceae	Dayo
Bixa Orellana	Bixaceae	Caca
Carica Papaya	Caricaceae	Awanca
Ipoemoea Batatas	Convolvulaceae	Acage
Capsicum chinense	Solanaceae	Giimo
Capsicum sp.	Solanaceae	Giimo
Physalis angulata	Solanaceae	Cowañe moncamo
Solanum sessiliflorum	Solanaceae	Daboca
Crescentia Cujete	Bignoniaceae	Owewe
Clibadium asperum	Compositae	Cooñei

WILD FOODS

Auricularia fuscusuccinea	Auriculariaceae	Nenendape
Astrocaryum Chambira	Palmae	Oopogencawę
Bactris sp.	Palmae	Ica
Bactris Gasipaes	Palmae	Tewe
JesseniaP Bataua	Palmae	Petowę
Maximiliana Maripa	Palmae	Oompa
Socratea exorrhiza	Palmae	Yedemo
Phytelephas macrocarpa	Palmae	Wamowę
Undetermined	Palmae	Omacabo
Heteropsis sp.	Araceae	Otome
Costus erythrocoryne	Zingiberaceae	Gonequemo
Costus scaber	Zingiberaceae	Odengimoncagi
Dimerocostus strobilaceus ssp. strobilaceus	Zingiberaceae	Ñenenquemo
Cecropia sciadophylla	Moraceae	Mangimeo
Dialium guianensis	Leguminosae	Dicademo
Inga sp.	Leguminosae	Iwa ao
Inga sp.	Leguminosae	Ewemao, wenemęngo
Protium sp.	Burseraceae	Wingitagę
Hiraea sp. nov.	Malpighiaceae	Dowemeñei
Tapura amazonica	Dichapetalaceae	Awęncatomo
Herrania nitida	Sterculiaceae	Bognica
Theobroma sp.	Sterculiaceae	Meęeca,
Undetermined	Sterculiaceae	Bogiwę
Marcgravia sp.	Marcgraviaceae	Namontaque

WILD FOODS cont'd.

Rheedia Spruceana	Guttiferae	Contaca
Leonia glycyarpa	Violaceae	Yemenca
Casearis sp. fasciculata	Flacourtiaceae	Yepenemoncawe
Casearia prunifolia	Flacourtiaceae	Yepenemoncawe
Mayna odorata	Flacourtiaceae	Bogimoncamo
Begonia sp.	Begoniaceae	Omencai
Gustavia longifolia	Lecythidaceae	Nonginca
Grias Neuberthii	Lecythidaceae	Wingaca
Calyptranthes plicata	Myrtaceae	Cowadewe
Loreya collatata	Melastomataceae	Titemeñeca
Undetermined	Melastomataceae	Ewengii
Undetermined	Sapotaceae	Oopowe
Undetermined	Apocynaceae	Wepemonca
Solanum pectinatum	Solanaceae	Daboca
Coussarea brevicaulis	Rubiaceae	Omancomo
Pentagonia parvifolia	Rubiaceae	Boyomo
Cayaponia Ruizii	Cucurbitaceae	Cagiwenca
Undetermined	-	Contaca
Undetermined	-	Titequewe
Undetermined	-	Tañemo

HALLUCINOGENS

Dictyonema sp. nov.	Dictyonemataceae	Nenendape
Banisteriopsis muricata	Malpighiaceae	Mii
Bryophyta – misc. genera		Kigiwai

MEDICINES

Plants used for fungal infections and/or scabies and mite infestations

Iryanthera cf. elliptica	Myristicaceae	Awamoncawe
Iryanthera juruensis	Myristicaceae	Wingimoncawe
Iryanthera cf. paraensis	Myristicaceae	Wecaiwe
Otoba parvifolia	Myristicaceae	Ayepewe
Virola calophylla	Myristicaceae	Tegidewe
Enterolobium sp.	Leguminosae	Cenimowe
Undetermined	Leguminosae	Acowe
Calycophyllum acreanum	Rubiaceae	Ooyowe
Curarea tecunaru	Menispermaceae	Oonta
Undetermined	—	Dabetawe

Plants used for warble fly (Dermatobius hominus)

Undetermined	Araceae	Cowentobecagi
Hevea guianensis	Euphorbiaceae	Noogowe
Undetermined	Apocynaceae	Ceneiwe

Plants used for tooth decay

Sphaeropteris sp.	Cyathaceae	Toyoba
Piper augustum	Piperaceae	Nempocao

Piper conejosense	Piperaceae	Yacabe
Undetermined	—	Menetade
<i>Plants used for various stings and bites—Scorpion, Spider, Insect, Stingray</i>		
Solanum pectinatum	Solanaceae	Daboca
Solanum sessiliflorum	Solanaceae	Daboca
Pentagonia spathicalyx	Rubiaceae	Boyomo
<i>Plants used for Snakebite</i>		
Philodendron sp.	Araceae	Cayatamo
Renealmia Asplundii	Zingiberaceae	Teetemo
Renealmia thyrsoidea	Zingiberaceae	Teentecagi
Renealmia sp.	Zingiberaceae	Teentebo
Urera baccifera	Urticaceae	Wento
<i>All Other Medicinal Plants</i>		
Jessenia Bataua	Palmae	Petowe
Maximiliana aff. maripa	Palmae	Oompa
Urera baccifera	Urticaceae	Wento
Guatteria cf. Schunkeyigoi	Annonaceae	Meñedowe
Siparuna sp.	Monimiaceae	Nonangonca
Begonia sp.	Begoniaceae	Omencai
Capsicum chinense	Solanaceae	Giimo
Capsicum sp.	Solanaceae	Giimo
Mansoa Standleyi	Bignoniaceae	Wiyagei
Duroia hirsuta	Rubiaceae	Owecawe

AURICULARIACEAE

Auricularia cf. **fuscosuccinea** (Montague) Farl., *Bibliogr. Index* (1905) 307.

Collect.: Davis and Yost 932.

Waorani Informant: Geque (m). Downriver dialect: n.v. *nēnēdapē*

This gelatinous fungus grows commonly on fallen logs in the forest and in the open swidden agricultural clearings. Today, some Waorani roast the fungus over an open fire and eat it with salt, a practice that they have learned in recent years from the neighboring Quichua.

Many indigenous groups in the Amazon eat this fungus. The Bora of the Rio Ampiyacu in Peru boil the fungus and eat it with cassava (*Manihot esculenta*) and hot sauce (*Capsicum* sp.).

DICTYONEMATACEAE

Dictyonema sp.

Collect.: Davis and Yost 1051.

Waorani Informant: Tomo & Cento (m). Upriver dialect: n.v. *nɛnɛndapɛ*

This conspicuous genus of a lichenized basidiomycete is extremely rare in Waorani territory. What has been considered a new species by a leading lichenologist, this peculiar plant, growing on rotten wood, has a white hymenial layer and a bright green/blue upper surface (M. Hale pers. comm.).

The Waorani name *nɛnɛndapɛ* is a name applied to many fungi, but informants suggest that this one was once used in shamanistic ritual. It was last employed some four generations ago—approximately 80 years—when “bad shamans ate it to send a curse to cause other Waorani to die.” The drug was prepared as an infusion with various species of Bryophyta, and caused severe headaches and confusion when drunk. When adequate supplies are available, this plant should be tested for hallucinogenic properties. This is the first report of a potentially hallucinogenic basidiolichen.

It is also reported to cause sterility and to be put into a child's drink to cause barrenness. At the moment, it is unclear whether this is a *post-hoc* explanation of why some women are sterile or whether it indicates active chemical constituents. Although no peculiar lichen acids have been reported, the genus is very poorly known and warrants phytochemical investigation.

CYATHACEAE

Sphaeropteris sp.

Collect.: Davis and Yost 964.

Waorani Informant: Tomo (m). Upriver dialect: n.v. *toyoba*

This species, a common tree fern that attains a height of four meters in the primary forest, is used to soothe toothache. The Waorani collect the sap and keep it for a day until it oxidizes and thickens; they then apply it directly to exposed nerves as an anesthetic.

GRAMINEAE

Bambusa sp.

Collect.: Davis & Yost 1027.

Waorani Informant: Tomo (m). Upriver dialect: n.v. *oona*

This bamboo grows to a height of ten meters both on low river flats and the slopes of steep clay hills. The internode length makes it ideal for dart holders and flutes. Pieces of the stem provide improvised knives.

Setaria vulpiseta (Lam.) R. et S., Syst. 2 (1817) 495.

Collect.: Davis & Yost 947.

Waorani Informant: Geque (m). Downriver dialect: n.v. *gage*

This common grass grows to a height of 2.5 meters in open sunlight around clearings and house sites. The inflorescence serves as a paint brush to decorate the body with *winca* (possibly *Genipa* sp.) and *caca* (*Bixa Orellana*).

Zea Mays L., Sp. Pl. (1753) 971.

Collect.: Davis & Yost s.n.

n.v. *cagingo*

Maize, although a relatively minor food crop of the Waorani, is important because it is the first cultigen to be ready to harvest in a new garden. Informants from the more isolated regions claim that in past generations maize held a far more significant role than any other food crop, but this changed when plantains became successful.

Undetermined specimen of Gramineae

Collect.: Davis & Yost 946.

Waorani Informant: Geque (m). Downriver dialect: n.v. *yemingo*

This unidentified bambusoid grass grows commonly in the primary rain forest. The flowers are conspicuous with dangling bright yellow anthers.

The Waorani carefully split the new shoots vertically and use the exposed edges as a knife to cut the umbilical cord of a newborn infant or as an improvised knife to butcher an animal killed in the forest.

PALMAE

Astrocaryum Chambira Burret in Fedde, Repert. 35. (1934) 152. Collect.: Davis & Yost 978.

Waorani Informant: Tomo (m). Upriver dialect: n.v. *oopo-gɛncawɛ*

A common tree of the primary rain forest, the chambira palm is a plant that the Waorani rely on heavily for a variety of uses. Both the immature and mature fruits are eaten, and the apical leaf shoots provide an important fibre which is rolled into twine for hammocks, fishnets, carrying bags and necklaces. Since the Waorani often cut down mature trees to gather the fibre, and since a single large hammock may require as many as twenty trees, this tree is one of the resources that may become scarce if a village remains in one area for a long time.

The Waorani have various names for the chambira palm, depending upon its stage of development. Seedlings are called *oonɛoncagi*, saplings from 2-7 meters are *oonɛmpa* and, once the trunk emerges, the plant receives its mature name *oopogɛcawɛ*.

Although the Waorani do not recognize any medicinal properties in *Astrocaryum Chambira*, certain other species of *Astrocaryum* are used medicinally elsewhere. *Astrocaryum Ayri* Mart. has a "green fruit that holds 10 grams of a potable liquid which has medicinal properties. It is used as a laxative and against jaundice. When the fruit is ripe, the liquid is transformed into a fleshy mass which contains 18% of the oil known as *oleo de ayry*. When the substance is dried, it is reputedly used as a "taenifuge" (Pio Correa 1926).

In Brazil, the fruits of *A. Chambira* are used to treat erysipelas (Usher 1974), and the fruit pulp is said to be antihelminthic (Pereira 1929).

Bactris sp.

Collect.: Davis & Yost 977.

Waorani Informant: Tomo (m). Upriver dialect: n.v. *iica*

A common forest tree that grows to 10 meters high, this species has long leaves with extremely thorny leaf bases. The leaves are commonly used for thatch, and the fruit is eaten.

Although the Waorani do not use this plant medicinally, various species of *Bactris* are said to have medicinal properties. In Colombia, the fruits of *Bactris minor* Jacq. are employed in a decoction as an antihelminthic and laxative. They are also used to treat snakebite (Garcia-Barriga 1974). In Guyana, a decoction of the heart of *Bactris oligoclada* Burret is valued in treating bronchitis (Fanshawe 1950).

Bactris Gasipaes HBK., Nov. Gen. et Sp. 1 (1815) 302.

Collect.: Davis & Yost s.n.

n.v. *tewé*

Such is the importance of this semi-cultivated palm that the Waorani "new year" (*dagénca tedé*) is marked by the end of its fruiting cycle. "Chonta" season runs from November to April and is divided into six periods: blossoms falling down; fruits starting to form; fruits starting to ripen; fruits all ripe; fruits nearly gone; fruits all gone.

While the fruits (*dagénca*) provide an important source of carbohydrate and vitamins, the extremely hard wood (*tepa*) is used to make spears, blowguns and various utensils. Because of its durability, it is also a favorite source material for roof supports and other construction purposes.

Geonoma sp.

Collect.: Davis & Yost s.n.

Waorani Informant: Geque (m). Downriver dialect: n.v. *mo*

This low palm grows 1.2 meters tall in the primary forest and provides the traditional Waorani thatch. The leaves, which are applied in three layers on an A-framed longhouse, are not particularly durable, lasting at the most one year. In recent years, the Waorani have turned to other more durable palms, largely in imitation of their lowland Quichua neighbours.

Geonoma sp.

Collect.: Davis & Yost 960

Waorani Informant: Geque (m). Downriver dialect: n.v. *ted-enowéncabo*

This medium-sized (3 m.) palm of the primary forest supplies leaves for wrapping food; the seeds provide material for beads.

Geonoma sp.

Collect.: Davis & Yost 1015

Waorani Informant: Geque (m). Downriver dialect: n.v. *oomawé*

This palm is a 4-meter treelet of the primary rain forest. It is used to improvise hunting and war spears. Before the arrival of metal tools that could cut chonta (*Bactris Gasipaes*), spears were fashioned from this palm exclusively.

Jessenia Bataua (Mart.) Burr. in Notzbl. 10 (1928) 300.

Collect.: Davis & Yost 1004.

Waorani Informant: Geque (m). Downriver dialect: n.v. *petowé*

This palm which is a common tree (30 m. tall) of the primary forest is one of the most important Waorani plants. The leaves provide thatch; the fibrous leaf bases are broken up and used to clean the bore of blowguns, to start fires and to make flares; the fruit, if boiled, turns very hard, but upon gentle warming, provides a delicious, oily paste; the adventitious roots are employed medicinally to treat worms, diarrhea, headaches and stomach ailments.

As with most of the palms, the Waorani used derived terms to refer to the various plant parts. The fruits are *petomo*, the leaves *petoba*, the fibrous leaf bases *petocoo* and the adventitious roots *peto*. The mature tree is known as *petowé*.

In Colombia, this species is an important medicine. In the eastern llanos, the oil of the fruit has been used for forty years to treat tuberculosis and other pulmonary ailments. It is also esteemed in treating bronchial problems and colds and may be taken orally or injected (García-Barriga 1974, Perez Arbeláez 1956). In the Darien, Panama, the oil is considered an anodyne (Duke 1968).

Maximiliana aff. **Maripa** (Correa) Drude in Martius, Fl. Bras. 3, pt. 2 (1882) 452.

Collect.: Davis & Yost 963.

Waorani Informant: Geque (m). Downriver dialect: n.v. *oompa*

An enormous tree attaining a height of 50 m. in the primary forest, this tree is very important for the Waorani. The petiole is split and cut into short lengths for making darts for blowguns. The fruits are eaten as food and used in an infusion to treat colds.

Again, the Waorani refer to the various stages of growth by separate terms. The seeds are called *gaibamo*, and larger saplings are called *nampacagi*, until the plant reaches maturity. Once it has born fruit, the tree is called *oompa*.

Phytelephas macrocarpa Ruiz et Pav. in Syst. Veg. 301 (1798).
Collect.: Davis & Yost 997.

Waorani Informant: Nange. Upriver dialect: n.v. *wamowé*

This palm, called *tagua* in Spanish, is a medium sized tree (8 m.) growing on disturbed ridgetops, or along the river banks throughout Waorani territory. It has a brown, woody basal fruit (*wamomo*) with a delicious white, fleshy pulp much esteemed by the Indians. The stem (*wamoncagi*) is for crowns and improvised darts, the leaf (*wamonta*) for baskets, and the fibre (*wamongi*) for brooms, torches, fire starters or blowgun bore-cleaner.

The fruits contain from six to nine seeds with a thin brown layer on the outside and a very hard endosperm which is the source of vegetable ivory. At one time Ecuador was the chief exporting nation of this commodity and many indigenous tribes were involved in the collection of the seeds. The Waorani were not affected by the vegetable ivory trade and did not participate.

Socratea exorrhiza H. Wendl. in Bonplandia, 8 (1856) 264.
Collect.: Davis & Yost 948.

Waorani Informant: Geque (m). Downriver dialect n.v. *yédemo*

This extremely hard forest tree of 30 m. has a conspicuous, edible, yellow fruit. The Waorani use the hard wood to make peccary spears.

Wettinia cf. **guinaria** (Cook et Doyle) Burr. in Notizbl. 10 (1930) 941.

Collect.: Davis & Yost 1049.

Waorani Informant: Tomo & Cénto (m). Upriver dialect: n.v. *cayewebéwé*

This medium-sized tree (15 m.) of the primary forest is characterized by brown urticating hairs on the fruit. The wood is used for spears and blowguns when no chonta (*Bactris Gasipaes*) is available. The leaves provide emergency thatch.

Undetermined specimen of Palmae

Collect.: Davis & Yost 949.

Waorani Informant: Geque (m). Downriver dialect: n.v. *giyi-cabemo*

A small palm that attains 4 m. in the primary forest, this treelet has small, hard, black fruits which are shot through blowguns to kill small birds.

Undetermined specimen of Palmae

Collect.: Davis & Yost 1016.

Waorani Informant: Geque (m). Downriver dialect: n.v. *omacabo*

The leaves of this 6 m. palm are especially resistant to rot and, consequently, are highly prized as thatch. The fruits are edible.

Undetermined specimen of Palmae

Collect.: Davis & Yost 929.

Waorani Informant: Taade (m). Ridge dialect: n.v. *tepa*

This large 20 m. tree grows in the primary rain forest; the wood is employed for blowguns.

The Waorani also use the various species of chonta (*Bactris Gasipaes* and *Iriarteia* sp.) to make blowguns. Two matching sections of wood 3 meters long by 3 centimeters thick are longitudinally grooved and bound together so that the grooves form a 1-centimeter bore the length of the blowgun. The two pieces are wrapped with a vine (*Heteropsis* sp.) and sealed with beeswax. The bore is then enlarged and polished with fine sand and water as an abrasive. The result is a surprisingly straight, highly polished bore. Compared to other Amazonian blowguns, these are rather heavy but very efficient.

CYCLANTHACEAE

Cyclanthus sp.

Collect.: Davis & Yost 965.

Waorani Informant: Geque (m). Downriver dialect: n.v. *wino*

In past generations, the men folded the leaves of this small unidentified plant of the primary forest floor to fashion a long penis sheath, while the women hung a flap of the leaf over a G-string; but by the time of contact, this practice had died out.

ARACEAE

Heteropsis sp.

Collect.: Davis & Yost 951.

Waorani Informant: Geque (m). Downriver dialect: n.v. *otome*

The bark of this liana is used to bind the two halves of a blowgun, to make baskets and to lash together beams for house construction. It is the strongest liana of the forest and holds its shape for a long time. The Waorani name *otome* means 'basket vine'. The Waorani eat the yellow fruit and recognize that animals and birds such as woolly monkeys (*Lagothrix lagotricha*), toucans (*Ramphastos cuvieri*) and oropendolas (*Zarhunchus wagneri*) also frequently feed on it.

Philodendron sp.

Collect.: Davis & Yost 1023.

Waorani Informant: Cénto (m). Downriver dialect: n.v. *ome*

The root and the stem of this liana are crushed in hot water, and the decoction is drunk two or three times daily by victims of *cayatamo* (*Bothrops castelnaudi*) bite, one of eight venomous snakes found in Waorani territory.

Other authors have suggested that several species of *Philodendron* in the northwest Amazon have pharmacologically active principles. The leaves and petioles of *Philodendron craspedromum* R.E. Schultes provide a piscicide among the Desana Indians of the Rio Papurí, Colombia: the leaves are cut, tied into

a bundle and left to ferment for two days before being crushed and thrown into the water to stun fish (Schultes in prep.). The Kubeos and other tribes of the Vaupés in Colombia use the pulverized and dried inflorescences of *Philodendron dyscarpium* R.E. Schultes as a contraceptive: the powder is added to the food of the women (Schultes in prep.).

Undetermined specimen of Araceae.

Collect.: Davis & Yost 962.

Waorani Informant: Geque (m). Downriver dialect: n.v. *co-wəntobɛcagi*

This unidentified climbing epiphyte of the primary forest has a conspicuous red spadix and a compound leaf with ten segments. The aroid is used to treat warble fly infestations (*Dermatobius hominus*) by rubbing the sap from the fruit over the infected spot to draw out the larva.

Because the palmate leaf is said to resemble that of yuca (*Manihot esculenta*), the plant is ritually brushed over children so that they will grow up able to raise ample supplies of yuca.

DIOSCOREACEAE

Dioscorea trifida L., Suppl. Plant Syst. Veg. (1781) 427.

Collect.: Davis & Yost 992.

Waorani Informant: Oncaye (f). Downriver dialect: n.v. *cowango*

The Waorani cultivate this liana for its edible tuber by propagating it vegetatively with pieces of the tuber. It is commonly planted around house sites or along the margin of cultivated plots.

MUSACEAE

Musa paradisiaca L., Sp. Pl. (1753) 1043.

Collect.: Davis & Yost s.n.

n.v. *pɛɛnɛ*

The Waorani widely cultivate plantains, which rank in importance with yuca (*Manihot esculenta*) and chonta (*Bactris Gasipaes*) as a source of carbohydrate. Some Waorani families use it

more than other families, depending much on personal preference. It is boiled when ripe and served as a drink or boiled with meat when yet green.

ZINGIBERACEAE

Costus erythrocoryne K. Schum. in Engler, Pflanzenr., Zingib. 4:46 (1904) 410.

Collect.: Davis & Yost 1029.

Waorani Informant: Cęnto (m). Downriver dialect: n.v. *gonę-
quemo*

A common herb of river banks and flats, this species is a favorite of Waorani children who suck the spicy water from the mature fruits as a condiment. Adults also suck on it to stave off hunger while traveling through the forest.

The Taiwano and Kabuyari Indians of the Amazon of Colombia use the powdered leaves as a snuff to staunch persistent nose-bleed (Schultes in prep.).

Costus scaber R. et P., Fl. Peru: 1, pt. 2 (1798) t.s.

Collect: Davis & Yost 940.

Waorani Informant: Geque (m). Downriver dialect: n.v. *odę-
ngimoncagi*

Costus scaber, a low herb of the primary forest, is valued as a condiment by the Waorani. The spicy stem is commonly sucked as refreshment.

Dimerocostus strobilaceus in O. Kuntze ssp. *strobilaceus* Maas in Fl. Neotrop., 8 (1972) 22.

Collect.: Davis & Yost 1028.

Waorani Informant: Cęnto (m). Downriver dialect: n.v. *nęnęn-
quemo*

The fruits of this 3 m. scandent herb are sucked as refreshment by Waorani children.

Renealmia Asplundii Maas in Flora Neotrop. 18 (1977).

Collect.: Davis & Yost 933.

Waorani Informant: Geque (m). Downriver dialect: n.v. *tęęn-
temo*

This low herb of the primary forest is one of the main Waorani snakebite remedies. After the stem is pounded to a pulp and mixed with water, the infusion is drunk once a day to reduce swelling until the patient is cured. It is employed specifically for the jergon or fer-de-lance (*Bothrops atrox*), known as *nɛnɛnɛnca*.

Other species of *Renealmia* are reputed to have medicinal properties. In Brazil, the seeds of *Renealmia domingensis* Horan. are believed to control menstruation. The juice of this plant was apparently used by the Maya to treat hemorrhoids (Usher 1974).

The Wai-wai Indians of Guyana boil the entire plant of *Renealmia pedicellaris* A.C. Smith and bathe in the decoction to reduce fever (Altschul 1973).

Renealmia thyrsoidea (R. et P.) P. et E., Nov. Gen. et Sp. 2 (1838)
25. t. 134.

Collect.: Davis & Yost 934, 935.

Waorani Informant: Geque (m). Downriver dialect: n.v. *tɛɛntɛcagi*

The Waorani recognize two varieties of this species: one, known as *tɛɛntɛmo* (D 934), has yellow flowers and bright red bracts; the other, *tɛɛntɛcagi* (D 935), has a conspicuous black lip on the corolla and pink bracts. Both forms are valued in treating snakebite by crushing the stem and drinking an infusion once a day to prevent swelling.

***Renealmia* sp.**

Collect.: Davis & Yost 1024.

Waorani Informant: Cɛnto (m). Downriver dialect: n.v. *tɛɛntɛbo*

Like other species of this genus, this low growing herb of the primary forest is esteemed in treating snakebite. The stem is crushed and a hot infusion, drunk once a day, is said to reduce swelling and internal bleeding.

MARANTHACEAE

Calathea Standleyi Macbr. in Publ. Field Mus. Nat. Hist., Bot. Ser., 11 (1931) 54.

Collect.: Davis & Yost 941.

Waorani Informant: Geque (m). Downriver dialect: n.v. *oyon-cabo*

Because the leaves of this common species are flexible and do not split when bent or rolled, they are used to wrap cooked meat, fish, yuca and other foods.

Some species of *Calathea* have been employed as medicine in the northwest Amazon. The Kofan of Ecuador boil the leaves of *Calathea roseo-pieta* Regel to prepare a medicine for treating mouth sores (Schultes in prep.). *Calathea Veitchiana* Veitch ex Hooker fil. is often added to *Banisteriopsis Caapi* (Spr. ex Gris.) Morton in preparing an hallucinogenic drink in the northwest Amazon.

Ischnosiphon obliquus (Rudge) Koern. in Nouv. Mem. Soc. Nat. Mosc. 11 (1859) 341.

Collect.: Davis & Yost 1045.

Waorani Informant: Tomo (m). Upriver dialect: n.v. *gaya-quewencagi*

The Waorani use the stems of this common herb of the seasonally inundated bottomlands as peace spears at festivals. The guests thrust the pliable 'spear' into the ground in front of the host, demonstrating their intent to be peaceful during their visit.

ORCHIDACEAE

Selenipedium sp.

Davis & Yost 1048.

Woarani Informant: Tomo (m). Upriver dialect: n.v. *menega-gowé*

This terrestrial orchid is said to attain 5 m. in height. The erect hollow stem is utilized as a training blowgun for young Waorani boys, and in an emergency may also be used by adults as an improvised blowgun.

PIPERACEAE

Piper augustum Rudge, *Icon Pe. Gui.* (1805) 10, t. 7.

Collect.: Davis & Yost 938.

Waorani Informant: Geque (m). Downriver dialect: n.v. *nempocao*

The Waorani break the stems of this shrub off and use them as tooth brushes. The ancestors employed this plant to prevent tooth decay and deliberately blacken teeth.

Various species of *Piper* have been reported as medicines in the northwest Amazon. In the Colombian Amazon, a poultice of the leaves of *Piper Hostmannianum* (Miq.) C. DC., is applied to warts to hasten their disappearance. The Culina Indians of eastern Peru prepare a snuff from the dried leaves and roots of *Piper interitum* Trel. ex Macbride as a tobacco substitute; the essential oils may have psychoactive properties. The Karijonas of the upper Vaupés treat bronchial ailments, including tuberculosis, by preparing a hot tea of the leaves and stems of *Piper Schultesii* Yunck, which serves as a strong diuretic. The Kofan of Ecuador crush the aromatic leaves and stems of *Piper serpens* (Sw.) Loudon to apply as a poultice to relieve the sting of the large "conga" ant (Schultes in prep).

Piper conojoëense Trel. et Yunck., *Piperaceae Northern S. Am.* (1950) 46.

Collect.: Davis & Yost 939.

Waorani Informant: Geque (m). Downriver dialect: n.v. *yacabew*

The stems of this common shrub are broken off at the nodes and used as tooth brushes by the Waorani. The ancestors are said to have used this plant to turn teeth black, and it was thought to prevent tooth decay.

MORACEAE

Cecropia sciadophylla Mart. in *Flora*, 24 (1841) pt. 2. Beibl. 93.

Collect.: Davis & Yost 921.

Waorani Informant: Taade (m). Ridge dialect: n.v. *mangimfo*

This common tree, which yields a delicious fruit similar in taste to figs, is a delicacy to the Waorani. Toucans (*Ramphastos cuvieri*) and piping guans (*Pipile pipile*) are said by the Waorani to prefer the fruits of this species.

Most indigenous groups in the northwest Amazon consider the fruits of *Cecropia* unpalatable (Schultes, pers. comm.). Many groups burn the leaves of this species to obtain an alkaline admixture for coca chewing. Certain species of *Cecropia* are used medicinally in the Amazon. The juice from the stem of *Cecropia peltata* L. is used in Brazil to treat dysentery (Usher, 1974). *C. tolimensis* Schultes et Villarreal has fruits which are taken in Colombia to treat fever (Altschul, 1973).

Ficus maxima Miller, Gard. Dict., ed. 8 (1768) No. 6.

Collect.: Davis & Yost 1040.

Waorani Informant: Tomo (m). Upriver dialect: n.v. *corotamo*

The inner bark is pounded and peeled off as a single tube-shaped piece to make cloth slings for carrying children or storage bags for kapok (*Ceiba pentandra* (L.) Gaertn.). This is one of six reported species that the Waorani use for bark cloth.

Perebea guianensis Aubl., Hist. Pl. Gui. Franc. 2 (1775) 953. t. 361.

Collect.: Davis & Yost 1009.

Waorani Informant: Tomo (m). Upriver dialect: n.v. *bataca*

The sap of this species is esteemed as hair oil, and the spiny dried fruit serves as a comb or hair brush.

URTICACEAE

Urera baccifera (L.) Gaud. Freyc., Voy. Bot. (1826) 497.

Collect.: Davis & Yost 956.

Waorani Informant: Geque (m). Downriver dialect: n.v. *wento*

All surfaces of this scandent shrub are covered with urticating hairs. The Waorani utilize the leaves either to punish children or as a means of transferring their own adult strength to the children. In the latter instance, an adult may return from a long hard day in

his gardens, gather the village children, and then brush each child with the painful plant to instill in them his own ability to work hard.

The Waorani also use this plant to relieve fainting and all pain, including that from aching muscles, arthritis, pulled muscles, snakebite, stingray and stings of the conga, azteca and fire ants.

The roots of *Urera baccifera* are said in the Colombian Amazon to have antihemorrhagic properties, and an infusion of the leaves alleviates erysipelas (Garcia-Barriga 1974). In Puerto Rico, a decoction of the roots is employed in treating gonorrhea (Usher 1974).

MENISPERMACEAE

Curarea tecunarium Barn. et Kruk. in Mem. New York Bot. Gard., 22:2 (1971) 12.

Collect.: Davis & Yost 943.

Waorani Informant: Geque (m). Downriver dialect: n.v. *oonta*

This species is well recognized as one of the principal sources of an especially strong arrow and dart poison prepared in the northwestern Amazon. It is the most important source of poison for the Waorani, and the preparation of curare from it is a highly esteemed skill.

The outer bark of the liana is shaved, shredded and placed in a funnel-shaped leaf compress suspended between two hunting spears. Cold water is then percolated through and the drippings collected in a small ceramic pot. This dark-colored liquid is slowly heated over a fire and brought to a frothy boil numerous times until the fluid thickens. It is then cooled and later reheated, until a thin layer of viscous scum gradually forms on the surface. This scum is removed, the dart tips are spun in the viscid fluid and the darts are finally carefully dried by the fire.

Curarea tecunarium may have important medicinal properties as well. The Waorani apply the prepared poison directly to skin infections, bacterial or fungal, with proven results. Some Waorani have been known to ingest small amounts of the poison to treat stomach-ache and diarrhea. The Deni Indians of Brazil

crush the stems and let them soak in water with stirring; the resulting tea is drunk as a contraceptive (Schultes 1982).

Amazonian arrow-poisons have been the source of several important medicines in our Western pharmacopoeas. The strength of this species as a poison and its reported use as both a contraceptive and an anti-fungal agent strongly suggest the advisability of further phytochemical investigation.

ANNONACEAE

Guatteria cf. **Schunkevigoi** Simpson in *Phytologia*, 30(5) 307 (1975).

Collect.: Davis & Yost 1011.

Waorani Informant: Tomo (m). Upriver dialect: n.v. *menedowé*

When the bark of this forest tree is crushed and mixed with water, the pulp and water are rubbed over the head and shoulders of febrile individuals to force the "fever to flee."

MYRISTICACEAE

Iryanthera cf. **elliptica** Ducke in *Journ. Wash. Acad. Sci.* 26 (1936) 219.

Collect.: Davis & Yost 1020.

Waorani Informant: Cento (m). Downriver dialect: n.v. *awamoncawé*

The resin of this tree of the primary forest is a recognized antifungal agent. The Waorani remove the inner bark, twist the cambium and apply the resin directly onto infected areas. It is also used to kill mites and scabies. This plant is said to be appreciably stronger than *Virola peruviana* (A. DC.) Warb. (*Davis 1019*).

Iryanthera juruënsis Warb. ex Pilger in *Verh. Bot. Ver. Brand.* 47 (1905) 137.

Collect.: Davis & Yost 1014.

Waorani Informant: Geque (m). Downriver dialect: n.v. *wingimoncawé*

This tree of the primary forest attains a height of 50 m. The copious "resin" of the inner bark oxidizes to a brilliant red. The Waorani say that, when applied directly to fungal infections, the

resin kills the fungus “just like the dart poison” (*Curarea tecun-arum*).

Iryanthera Ulei Warb. contains 5-MeO-DMT (5-Methoxy-N, N-dimethyltryptamine) in its bark. Among the Bora and Witoto of the Rio Ampiyacu in Peru, *I. Ulei* and *I. macrophylla* (Benth.) Warb. together with several species of the related genus *Virola* (*V. elongata* (Benth.) Warb., *V. surinamensis* (Rol.) Warb., *V. lorentensis* A.C. Smith) are the sources of an oral hallucinogen (Holmstedt et al 1980). Recent fieldwork among the Bora has added *V. divergens* Ducke, *V. calophylla* Warb., *V. Pavonis* (A. DC.) A.C. Smith and *Iryanthera longiflora* Ducke to the list of hallucinogens from these two remarkable genera. The Waika of Venezuela also use many species of *Virola* either as hallucinogenic snuffs or as arrow-poisons. The principal species employed by the Waika are *V. calophylla* Warburg, *V. theiodora* (Spr. ex Bth.) Warb. and *V. calophylloidea* Markgraf.

Iryanthera cf. paraënsis Hub., in Bol. Mus. Para. (1910) 69.
Collect.: Davis & Yost 1005.

Waorani Informant: Tomo (m). Upriver dialect: n.v. *wecaiwé*

The inner bark of this medium-sized tree (15 m) is scraped and pounded and applied directly to fungal infections and infestations of mites.

Otoba parvifolia (Mkf.) A. Gentry in Notizbl. 9 (1926) 964.
Collect.: Davis & Yost 1008.

Waorani Informant: Tomo (m). Upriver dialect: n.v. *ayépewé*

Although the bark and bright red resin of this bushy plant are crushed and rubbed on the skin as a treatment for the bites of mites and fungus infections, the Waorani say that it is rarely used.

Several species in this genus are used throughout the northwest Amazon as an antifungal agents. The Tikuna Indians of Colombia call this species *sangre toro*; and, in the Napo region of Ecuador, it is known in Spanish as *sangre gallina*. In both areas, the Indians assert that the resin has medicinal properties (Acero Duarte 1979).

Virola calophylla Warb. in Nov. Act. Nat. Cur. 68 (1897) 231.
Collect.: Davis & Yost 1019.

Woarani Informant: Cénto (m). Downriver dialect: n.v. *tegidewé*

The inner bark of this forest tree is squeezed and the copious red "resin" is applied to fungal infections, scabies and infestations of mites. The Kubeo and Tucano Indians of the Rio Vaupés employ the fresh bark resin of *V. albidiflora* Ducke to treat skin sores (Schultes in prep.). The "resin" of *V. calophylla* and *V. calophylloidea* is processed and snuffed as an hallucinogen by the Kubeo, Puinave, Kuripaco, Barasana, Makuna and Taiwano of the Vaupes of Colombia. The nomadic Makú of the Rio Piraparaná ingest the exudate of the inner bark of *V. elongata* (Benth.) Warb. directly, without any of the elaborate preparation practiced by other tribes of the region (Schultes and Hofmann, 1980).

In Brazil, the "resin" of *V. surinamensis* (Rol.) Warb. is used to treat erysipelas, and an infusion of the bark is applied as a wash to cleanse wounds (Schultes in prep.).

MONIMIACEAE

Siparuna sp.

Collect.: Davis & Yost 923, 1052.

Waorani Informant: Taade (m). Ridge dialect: n.v. *nonangonca*

The red fruits of this scandent forest shrub are used by the Waorani to treat fever and headache. When crushed, the leaves and fruits are very pungent and are rubbed directly onto the face and head.

LEGUMINOSAE

Arachis hypogaea L., Sp. Pl. (1753) 741.

Collect.: Davis & Yost s.n.

n.v. *coromo*

The common peanut is one of the traditional cultigens of the Waorani.

Dialium guianensis (Aubl.) Sandw. ex A.C. Smith in Lloydia, 2 (1939) 184.

Collect.: Davis & Yost 1057.

Waorani Informant: Cento (m). Downriver dialect: n.v. *dica-*
demo

The fruits of this 70 m. forest tree, either green or ripe, may be eaten dry or, preferably, soaked in water.

Enterolobium sp.

Collect.: Davis & Yost 1026.

Waorani Informant: Tomo (m). Upriver dialect: n.v. *cɛnimowɛ*

Crushed and dropped directly into small streams, the bark of this tall (60 m.) forest tree serves as a fish poison. A hot decoction of the bark is valued also as a fungicide.

Inga sp.

Collect.: Davis & Yost 976.

Waorani Informant: Tomo (m). Upriver dialect: n.v. *iwa ao*

The Waorani eat the white flesh surrounding the black seeds of this tall forest tree, which has characteristic brown fruits covered with urticating hairs.

Inga sp.

Collect.: Davis & Yost 953.

Waorani Informant: Geque (m). Downriver dialect: n.v. *ɛwɛmao*,
wenemɛngo

The yellow-green fruits of this tall (40 m.) forest tree may be eaten, but according to the Waorani, if more than five of the seeds are ingested, vomiting occurs.

The Waorani recognize the fruit as a preferred food of all monkeys, the scarlet macaw (*Ara macao*), the mealy parrot (*Amazona farinosa*), and the dusty-headed parrotlet (*Forpus sclateri*).

Lonchocarpus Nicou (Aubl.) DC. *var. languidus* F.J. Herm. in
Journ. Wash. Acad. Sci. 37 (1947) 111.

Collect.: Davis & Yost 979.

Waorani Informant: Oncaye (f). Downriver dialect: n.v. *com-*
pago.

This was one of the traditional Waorani fish poisons, but it has been largely replaced by *Clibadium asperum* (Davis 294), (acquired from neighbouring lowland Quichua) because it is more effective on the larger streams and rivers where many of the Waorani now live. The Waorani still plant *Lonchocarpus Nicou* in their chacras, however, and use it in small feeder streams. They pound the root to a pulp and place it directly in the small, slow brooks where the effects are almost immediate.

Lonchocarpus Nicou is widely known as barbasco in the northwest Amazon; its root contains 20% rotenone (Usher 1974).

Lonchocarpus Nicou (Aubl.) DC. *var.* **Urucu** Killip & Smith in Journ. Wash. Acad. Sci. 37 (1947) 111.

Collect.: Davis & Yost 968.

Waorani Informant: Tomo (m). Upriver dialect: n.v. *mɛneco*

This variety of *Lonchocarpus Nicou* is also used by the Waorani, who semi-cultivate it by planting it throughout the forest. They use it in the same way as they do variety *languidus*, crushing the wood and root and casting them directly into a stream.

Pachyrhizus angulatus Rich ex DC., Prodr. 2 402.

Collect.: Davis & Yost s.n.

n.v. *capamo*

The Waorani cultivate the yam bean as a snack food to be eaten raw.

Undetermined specimen of Leguminosae.

Collect.: Davis & Yost 1006.

Waorani Informant: Tomo (m). Upriver dialect: n.v. *acowɛ*

The bark of this tall (80 m.) forest tree is crushed and employed as a fish poison. An infusion of the bark is also applied to treat fungal infections and infestations of mites and scabies. Since contact, Waorani have washed their clothes in a bath prepared with this bark to eliminate scabies.

SIMAROUBACEAE

Picramnia cf. **Spruceana** Engl. in Martius, Fl. Bras 12, pt. 2 (1877) 238.

Collect.: Davis & Yost 1012.

Waorani Informant: Geque (m). Downriver dialect: n.v. *degintai gipɛnii*

The leaves of this subcanopy tree are crushed to prepare an infusion which is used as a purple dye for fish nets, hammocks and carrying bags.

Picramnia sp.

Collect.: Davis & Yost 1010, 1032.

Waorani Informant: Cɛnto (m). Downriver dialect: n.v. *degintai gipɛnii*

The leaves are also crushed and soaked in water overnight, and the infusion is utilized as a purple dye for fish nets and carrying bags.

BURSERACEAE

Protium sp.

Collect.: Davis & Yost 1021.

Waorani Informant: Cɛnto (m). Downriver dialect: n.v. *wingitagɛ*

The fruits of this tall (60 m.) forest tree are edible.

MALPIGIACEAE

Banisteriopsis muricata (Cav.) Cuatrecasas in *Webbia* 13 no. 2 (1958) 490.

Collect.: Davis & Yost 967, 975.

Waorani Informant: Tomo (m). Upriver dialect: n.v. *mii*

This liana is the only hallucinogenic plant currently employed by the Waorani. Although both collections were made at the edge of chacras, the Waorani maintain that the plant is not cultivated, and frequently point it out as growing wild along river banks.

Whereas the use of the related hallucinogen *Banisteriopsis Caapi* is almost everywhere in the western Amazon defined as a social event, the imbibing of the drink prepared from *B. muricata* is a solitary experience among the Waorani. In the all-night ceremony, during which the *ido*, or shaman, is accompanied only

by his wife, the *ido* prepares the drug by scraping the bark and slowly boiling the brew.

According to our informants, the use of this drug is considered an aggressive act. It may be taken to cure illness but only if prepared by the one who caused the illness in the first place. "If someone consented to cure, it was an admission of guilt. If he didn't cure the victim, he would be killed. Sometimes he was killed after curing someone, because he was the one who caused it."

The Waorani call this species *mii* and clearly associate certain powers with it. A boy's uncle or grandfather will take a tiny piece of the liana and, using the windpipe from a toucan, piping guan or curassow as a blowgun, blow the wadded *mii* into the boy's lungs so that he will grow up to have powerful lungs and become a great hunter.

The Witoto of Pucó Urquillo on the Rio Ampiyacu in Peru call it *sacha ayahuasca*—"wild ayahuasca"—and say that it can be used just as ayahuasca (*B. Caapi*), but that it is weaker.

Hiraea sp. nov.

Collect.: Davis & Yost 1038.

Woarani Informant: Tomo (m). Upriver dialect: n.v. *dowemenei*

The fruit of this liana of the primary forest canopy is eaten.

DICHAPETALACEAE

Tapura amazonica P. et E., Nov. Gen. et Sp. 3 (1845) 41 t. 246. f. 2.

Collect.: Davis & Yost 1044.

Waorani Informant: Tomo (m). Upriver dialect: n.v. *awén-catomo*

The Waorani eat the fruits of this primary forest tree.

In the northwest Amazon a related species, *Tapura peruviana* Krause, (known in Colombia as *calentura chiricaspi*) is used medicinally: an infusion of the leaves is taken to reduce fevers (Schultes in prep.).

EUPHORBIACEAE

Hevea guianensis Aubl., Hist. Pl. Gui. Franç. 2 (1775) 871.

Collect.: Davis & Yost 1018.

Waorani Informant: Cénto (m). Downriver dialect: n.v. *noogowé*

The latex of this 60 m. forest tree is placed over warble fly infestations, where it hardens into rubber and suffocates the larva. The latex is also drunk as a tonic to make one strong.

Manihot esculenta Crantz., Inst. 1 (1766) 167.

Collect.: Davis & Yost 980, 981, 983, 984, 985, 986, 987, 988, 989, 990, 991, 998

Waorani Informant: Oncaye (f). Downriver dialect: n.v. *quewe* (growing plant), *cééne* (tuber)

While the Waorani are known for their hunting abilities, they depend on gardens for a large portion of the diet, and their principal source of carbohydrate is yuca (*Manihot esculenta*).

Although the Waorani are technically swidden agriculturalists, their method of propagating yuca is better termed slash-and-rot than slash-and-burn. Both men and women prepare the site by clearing out the underbrush, and then the women plant the cuttings at a 10 to 30 degree angle. All work is done in the shade, since the large trees are cut down by the men. The fields are only rarely burned off, and the Waorani prefer to plant either in a climax forest area or in an area that has lain fallow for a dozen or more years. The yuca, once planted, is the domain of the women who do all the planting, weeding and harvesting. They also prepare it for consumption, usually in the form of *tepé*, a mildly fermented beverage made by mixing small portions of masticated boiled pieces of the roots with large quantities of boiled root material mashed into a paste. The paste is fermented overnight and then mixed with water and drunk. The Waorani adult consumes from four to seven liters of *tepé* (containing approximately 500 grams of yuca mash per liter) each day, but he also eats much yuca boiled with meat whenever meat is available.

The Waorani recognize at least twenty varieties of sweet yuca, all of which are referable to *Manihot esculenta*.

- a) *Ẹwẹmongẹwe* — (Davis & Yost 980) This form is known as the “scarlet macaw’s yuca”, as the fruit is bright red. It grows to 3 m., has red petioles, deep purple leaves and a large root 10 cm. thick and up to 0.5 m. long.
- b) *Genempacawe* — (Davis & Yost 981) Attaining a height of 4 m., this form has dark green leaves and a white root.
- c) *Ẹdẹbẹi* — (Davis & Yost 982) The “leaning yuca”, is a variety which was much used by the ancestors. The leaves are light green, and the root measures 0.6 m. long and .15 m. wide. The flowers are pink.
- d) *Gimatoye* — (Davis & Yost 983) Growing luxuriantly on well drained hillsides, this variety has a very short white tuber, white flowers and light green leaves. It is especially valued as a yuca to be consumed with howler monkey meat.
- e) *Opatawẹye* — (Davis & Yost 984) This plant, “red yuca”, is an especially hardy form that does well on hillsides. The root is not so sweet as other varieties, so many Waorani do not plant it.
- f) *Namẹntawe* — (Davis & Yost 985) This type, which has a soft root, grows best on lowland terraces on well drained sites and is the sweetest of all forms recognized by the Waorani. The Waorani name means “white yuca.”
- g) *Wengoicawe* — (Davis & Yost 986) This type has a root up to 0.6 m. long and a sweet flavor.
- h) *Iwanca* — (Davis & Yost 987) The “howler monkey yuca” has a red, very sweet root.
- i) *Dawaquewe* — Another hardy variety that grows well on all sites, this form is known as the “true yuca” and produces a large, very sweet root.
- j) *Gitaincawe* — (Davis & Yost 989) This form is the “small yuca” which produces a short, stout root only 0.3 m. long.
- k) *Equemowe* — (Davis & Yost 990) Producing an enormous root as large as a human leg, this kind does well on hillsides.
- l) *Itẹcawe* — (Davis & Yost 991) The “yellow yuca” has a very small, yellow root 0.5 m. long and 3 cm. thick.

- m) *Dooyéwe* — (Davis & Yost 998) This kind grows to 8 m. tall and is called the “tall yuca.” It is the fastest growing type used by the Waorani and is reported not to flower; it produces a white, medium sized, sweet root.

Several other Waorani forms were mentioned by informants but not collected.

- n) *Wegompaca* — One of the “ancestor’s yuca”, this type is eaten with howler monkey meat but never with that of the woolly monkey. Like all of the ancestor’s yucas, it is not very sweet. It is planted selectively by only a few individuals.
- o) *Moncatadewe* — A very tall, unbranching form which produces a root that is red on the outside and white inside and quite sweet.
- p) *Tapadé* — A very tall form.
- q) *Bebawe* — The slowest growing kind.
- r) *Equemotawe* — A difficult form to grow. If not well weeded, it rots because the soil is too damp.
- s) *Tamawe* — An undescribed form.
- t) *Badépancawe* — An undescribed form.

SAPINDACEAE

Paullinia alata (R. et P.) G. Don subsp. *loretana* Macbr. in Bot. Ser. Field Mus. 13, pt. 3A, no. 2 (1956) 330.

Collect.: Davis & Yost 1039.

Waorani Informant: Cénto (m). Downriver dialect: n.v. *téénte-moneca*

The informant was aware of no use for this plant, but, since it had a name, he concluded that it must have been used once by the *Doorani*, the ancestors. The Waorani name, *tééntémoneca*, contains the morpheme for “viper,” so it is conceivable that it was used to treat snakebite.

Several species of *Paullinia* are employed medicinally in the northwest Amazon. The Karijona Indians of the Colombian Vaupés make an emetic of the leaves of *P. emetica* R.E. Schultes

(Schultes in prep.). *Paullinia Yoco* Schultes & Killip is used by the Inga, Siona, Kofan and Koreguaje Indians in Colombia, and it has been called the "most important non-alimentary plant in the economy of the natives of the Putumayo" (Schultes 1942a). The epidermis, cortex and phloem are mixed with cold water to make an extremely stimulating caffeine-rich beverage, which has also been used as an anti-malarial febrifuge in the Putumayo (Schultes 1942a).

MALVACEAE

Gossypium barbadense L., Sp. Pl. (1753) 693.

Collect.: Davis & Yost 920.

Waorani Informant: Taade (m). Ridge dialect: n.v. *dayo*

The Waorani cultivate cotton to make their G-strings and ceremonial arm bands. They also use it to decorate hunting and war spears.

BOMBACACEAE

Ceiba pentandra (L.) Gaertn. in Fruct. 2 (1791) 244. t. 133.

Collect.: Davis & Yost s.n.

n.v. *bobéwé*

Kapok fibre from this forest tree is spun onto poison darts to serve as fletching and an air seal between the dart and blowgun. The kapok fibre is called *co*, but the tree is termed *bobéwé*.

STERCULIACEAE

Herrania nitida (P. et E.) R.E. Schultes in Caldasia 2 (1943) 13.

Collect.: Davis & Yost 1030.

Waorani Informant: Cęnto (m). Downriver dialect: n.v. *boginca*

The Waorani eat the cauliflorous fruit of this species.

Theobroma sp.

Collect.: Davis & Yost 927.

Waorani Informant: Taade (m). Ridge dialect: n.v. *męneca*,
tobanaaca

The delicious pulp of the cauliflorous fruits of this forest tree is eaten.

Undetermined specimen of the Sterculiaceae

Collect.: Davis & Yost 1001.

Waorani Informant: Tomo (m). Upriver dialect: n.v. *bogiwé*

The green cauliflorous fruit of this 7 m. tall tree of the primary rain forest is edible and is known as *boginca*. The capuchin monkey and the squirrel monkey (*Saimiri sciurea*) eat it as well.

MARCGRAVIACEAE

Marcgravia sp.

Collect.: Davis & Yost 954.

Waorani Informant: Geque (m). Downriver dialect: n.v. *namontaque*

Children eat the orange-red fruits of this liana of the mid-canopy, and adult hunters recognize that it is consumed commonly by toucans (*Ramphastos cuvieri*), and various species of toucanets, aracaries and oropendolas.

Souroubea sp.

Collect.: Davis & Yost 972.

Waorani Informant: Tomo (m). Upriver dialect: n.v. *Oonta*

The bark of this liana is used to wrap the blowgun halves together. *Oonta* is the same name that the Waorani give to the curare liana, *Curarea tecunarium*.

Various species of *Souroubea* have been used medicinally in the northwest Amazon. The Indians of the Rio Apaporis use an astringent tea of the leaves of *Souroubea crassipetala* de Roon to treat mouth sores. The Karijona on the upper Vaupés in Colombia take a tea of the leaves of *S. guianensis* var. *cylindrica* Wittm. as a tranquilizing medicine, and the Taiwanos of the Rio Kananari of Colombia use a decoction of *S. guianensis* var. *corallina* (Mart.) Wittm. to calm apprehensive elderly tribal members who believe that they have been hexed (Schultes in prep).

GUTTIFERAE

Rheedia Spruceana Engl. in Martius, Fl. Bras. 12, pt. 1 (1888) 463.

Collect.: Davis & Yost 974.

Waorani Informant: Tomo (m). Upriver dialect: n.v. *contaca*

The Waorani eat the fruit of this 50 m. forest tree and recognize that most species of parrots and macaws also feed on it.

Tovomita sp.

Collect.: Davis & Yost 1003.

Waorani Informant: Tomo (m). Upriver dialect: n.v. *gingamonca*

The exocarp and the flesh of the fruits of this tall canopy tree of the primary rain forest are removed, and the hard shell is used to measure water to make dart poison.

Vismia sp.

Collect.: Davis & Yost 970.

Waorani Informant: Tomo (m). Upriver dialect: n.v. *gacamenewé*

This 30 m. forest tree has a copious yellow exudate which the Waorani employ as face paint.

The resinous exudate of *Vismia ferruginea* HBK. is commonly applied to skin sores in the Brazilian Amazon (Schultes in prep).

BIXACEAE

Bixa Orellana L., Sp. Pl. (1753) 512.

Collect.: Davis & Yost 1013.

Waorani Informant: Geque (m). Downriver dialect: n.v. *caca*

The aril around the seeds of this cultivated shrub is used as a bright red dye for pottery, blowguns and spears, as well as a face and body paint.

Elsewhere the root is considered to be an aid to digestion and the seeds an expectorant (Schultes in prep.) but the Waorani do not ingest the plant nor use it medicinally.

VIOLACEAE

Leonia glycyarpa R. et P., Fl. Per. 2 (1799) 69.

Collect.: Davis & Yost 1022.

Waorani Informant: Cento (m). Downriver dialect: n.v. *yemēnca*

The cauliflorous fruits of this small forest tree are eaten.

FLACOURTICEA

Carpotroche longifolia (Poepp.) Benth. in Journ. Linn. Soc. 5, Suppl. 2 (1861) 82.

Collect.: Davis & Yost 945.

Waorani Informant: Geque (m). Downriver dialect: n.v. *non-ginca*

Waorani rub the cauliflorous fruits onto children to ensure long life.

In Colombia, the bark of *Carpotroche amazonica* Mart. is valued as a caustic (Altschul, 1973). In Brazil, the oil from the seeds of this tree is applied to treat dermatitis and leprosy (Usher 1974).

Casearia fasciculata (R. et P.) Sleumer in Notizbl. 11 (1934) 955.

Collect.: Davis & Yost 1033.

Waorani Informant: Cento (m). Downriver dialect: n.v. *yepēnē-moncawē*

The sweet fruits of this small tree are eaten by the Waorani.

Casearia prunifolia HBK., Nov. Gen. et Sp. 5 (1821) 362.

Collect.: Davis & Yost 1031.

Waorani Informant: Cento (m). Downriver dialect: n.v. *yepēnē-moncawē*

The Waorani eat the yellow fruits of this small tree, and Waorani hunters recognize that these fruits are eaten by many birds and small arboreal mammals. According to the hunters it is the favorite food of the tamarin (*Saguinus fuscicollis*).

In the upper Amazon of Brazil, the leaves of *Casearia ovata* Willd. are brewed in a tea for treating rheumatism. The fruit is diuretic (Schultes in prep.).

Mayna odorata Aubl. in Hist. Pl. Gui. Franç. 2 (1775) 921. t. 352.
Collect.: Davis & Yost 1047.

Waorani Informant: Tomo (m). Upriver dialect: n.v. *bogimoncamo*

The fruit of this small tree is edible.

CARICACEAE

Carica Papaya L., Sp. Pl. (1753) 1036.

Collect.: Davis and Yost s.n.

n.v. *awanca*

The Waorani plant papayas in their gardens but recognize them as a recent introduction to the region.

BEGONIACEAE

Begonia sp.

Collect.: Davis & Yost 925.

Waorani Informant: Taade (m). Ridge dialect: n.v. *omencai*.

The succulent stems of this climber, which taste like rhubarb, are chewed as a condiment. Some Waorani suggest that it is good for colds.

LECYTHIDACEAE

Gustavia longifolia Poepp. ex Berg in Martius, Fl. Bras. 14, pt. 1 (1859) 472.

Collect.: Davis & Yost 1017.

Waorani Informant: Cento (m). Downriver dialect: n.v. *nonginca*

The fruits of this 20 m. forest tree are eaten. The Waorani consider it to be one of the most beautiful trees of the forest and frequently plant it around house sites and clearings.

Grias cf. **Neuberthii** Macbr. in Field Mus. Nat. Hist., Bot. Ser. 11 (1931) 30.

Collect.: Davis & Yost 973.

Waorani Informant: Tomo (m). Upriver dialect: n.v. *wingaca*

The cauliflorous fruits of this 30 m. forest tree are highly valued as an emergency food by all Waorani. During spearing raids, when chonta (*Bactris Gasipaes*) was out of season and the Waorani were forced to flee and live away from their gardens, they relied heavily upon this fruit.

Waorani hunters recognize that virtually all forest animals also eat it, including the spider monkey (*Ateles belzebuth*), squirrel monkey (*Saimiri sciurea*), woolly monkey (*Lagothrix lagotricha*) and both peccaries (*Tayassu pecari* and *T. tajacu*).

MYRTACEAE

Calyptranthes plicata McVaugh in Field Mus. Nat. Hist. Bot. Ser. 13, pt. 4, no. 2 (1958) 607.

Collect.: Davis & Yost 944.

Waorani Informant: Geque (m). Downriver dialect: n.v. *cowa-dewé*

When ripe, the fruit of this 4 m. forest tree is valued as a food. It is also thrown into streams and back eddies to attract fish. Because the wood is extremely tough and can be hardened, it was cut with stone axes and fire-hardened to make hunting and raiding spears before the arrival of metal tools. It is still used in an emergency to improvise hunting spears.

MELASTOMATACEAE

Loreya collatata Wurdack in Phytologia 18 (1969) 162.

Collect.: Davis & Yost 937.

Waorani Informant: Geque (m). Downriver dialect: n.v. *titéménéca*

The fruit of this tall (30 m.) forest tree is eaten. The Waorani name, meaning "tapir's wild cacao", highlights recognition of the fact that the fallen fruits are browsed by tapir (*Tapirus terrestris*) and wild peccary (*Tayassu pecari*, *T. tajacu*).

Undetermined species of the Melastomataceae

Collect.: Davis & Yost 1036.

Waorani Informant: Cénto (m). Downriver dialect: n.v. *ewéngii*

The blue fruits of this common shrub are edible.

THEOPHRASTACEAE

Clavija sp.

Collect.: Davis & Yost 1055.

Waorani Informant: Tomo (m). Upriver dialect: n.v. *namontaqui*

The beautiful aromatic flowers of this small shrub are prized and worn in coronas during festivals.

SAPOTACEAE

Undetermined specimen of the Sapotaceae

Collect.: Davis & Yost 1000.

Waorani Informant: Tomo (m). Upriver dialect: n.v. *oopowé*

This primary forest canopy tree, which may attain a height of 80 m., has a delicious edible fruit. The orange-red fruits yield a copious white latex in the exocarp and have a sweet flesh surrounding the black seeds.

APOCYNACEAE

Undetermined specimen of the Apocynaceae

Collect.: Davis & Yost 955.

Waorani Informant: Geque (m). Downriver dialect: n.v. *wepé-monca*

The Waorani consume the fruits of this 25 m. tree and drink the copious latex which the fruit contains. They also recognize that all forest animals also eat the fruits.

Undetermined specimen of the Apocynaceae

Collect.: Davis & Yost 957

Waorani Informant: Geque (m). Downriver dialect: n.v. *céneiwé*

The copious white latex of this small forest tree is used by the Waorani to treat warble fly larvae (*Dermatobius hominus*) infes-

tations. The latex is rubbed over the area to suffocate and draw out the larvae.

The Waorani note that the scarlet macaw (*Ara macao* L.) and the black hooded parrot (*Pionites melanocephala*) eat the fruit.

CONVOLVULACEAE

Ipomoea Batatas (L.) Poir. in Lam. Encycl. 6 (1804) 14.

Collect.: Davis & Yost 1053.

Waorani Informant: Tomo (m). Upriver dialect: n.v. *acagé*

The Waorani cultivate the sweet potato, often planting it around house sites. Although adults use it for variety in their diet, they do not rely heavily upon it. Children, however, frequently collect the tubers to boil or roast as snacks throughout the day.

SOLANACEAE

Brugmansia x insignis (Barb-Rodr.) Lockwood ex Davis, *comb. nov.*¹

Basionym: *Datura insignis* Barb. Rodr. Vellozia, ed. 2, 162 1891.

Collect.: Davis & Yost 1054.

Waorani Informant: Tomo (m). Upriver dialect: n.v. no name given

Although this cultigen was found growing in a Waorani garden on a river flat, it was not recognized by the informants. The solitary specimen was the only representative observed in Waorani territory; it was probably dispersed by the river.

Many indigenous groups of eastern Ecuador use this plant as a powerful hallucinogen. The Kofan make an infusion of the leaves which they drink in shamanistic ritual. The indigenous groups of the Rio Pastaza region of Ecuador prepare a potion from the inner pulp to foresee the future. Elsewhere the leaves and sap of

¹ Because of his untimely death, *Brugmansia* specialist Dr. Tommie E. Lockwood did not validly publish the combination *Brugmansia x insignis*. Lockwood did use this combination, however, in his account of *Brugmansia* for *Hortus Third* (Bailey and Bailey 1976) in which he explained the origin of this species as a hybrid between *B. suaveolens* (Humb. & Bonpl. ex Willd.) Bercht. et Presland and *B. versicolor* Lagerheim.

the plant are applied as a poultice to relieve aches and pains (Schultes in prep.).

Brunfelsia grandiflora D. Don *ssp. Schultesii* Plowman in Bot. Mus. Leaflet 23: 6 (1977) 259.

Collect.: Davis & Yost 958.

Waorani Informant: Geque (m). Downriver dialect: n.v. *wine-mecawé*

The Waorani use the wood of this species in house construction. Although they recognize that the fruits are toxic, they do not use the plant medicinally or as a hallucinogen.

Brunfelsia grandiflora is one of the most prized medicinal plants of the Amazon. The Quichua name *chiricaspi* or *chiricsanago* means "cold tree" and "cold medicine", referring to its effect of producing the sensation of chills. Indigenous groups throughout the northwest Amazon use this plant to treat fevers.

It is also widely employed as an hallucinogen and is often added to narcotic drinks prepared from *Banisteriopsis Caapi*; it produces a tingling sensation in the extremities and intensifies the effects of the narcotic drink.

Preparations of the plant are also used to treat rheumatism and arthritis (Plowman 1977).

Capsicum chinense Jacq. in Hort. Vindob. 3 (1776) 38. t. 67.

Collect.: Davis & Yost 993.

Waorani Informant: Oncaye (f). Downriver dialect: n.v. *giimo*

The fruits of this cultivated pepper are used for stomachache. It is never eaten as food but is often used by the shaman's wife to bring him out of the intoxication induced by *Banisteriopsis muricata*.

Physalis angulata L., Sp. Pl. (1753) 183.

Collect.: Davis & Yost 995.

Waorani Informant: Oncaye (f). Downriver dialect: n.v. *cowane moncamo*

Children often eat the sweet fruits of this 1 m. tall plant that grows in exposed areas.

Solanum pectinatum Dunal in DC. Prod. 13, pt. 1 (1852) 250.

Collect.: Davis & Yost 930.

Waorani Informant: Taade (m). Ridge dialect: n.v. *daboca*

The Waorani consider this species wild and claim that it was planted by the jaguar. The pulp of the fruit is rubbed into the hair almost daily to give lustre and to control head lice. When eaten, the acidic fruits are said to be effective in preventing the vomiting that normally results from scorpion stings and bites. A decoction of the fruits is also rubbed on any type of sting.

Solanum sessiliflorum Dunal, Solan. Syn. (1816) 43.

Collect.: Davis & Yost 918.

Waorani Informant: Taade (m). Ridge dialect: n.v. *daboca*

The fruits of this cultivated shrub are eaten or sucked to relieve thirst. They are also rubbed into the scalp to make the hair shine. The pulp of the fruit is imbibed in cases of scorpion stings and spider bites to prevent vomiting, and the fruits are rubbed onto any type of insect sting or bite to alleviate pain.

Related species of *Solanum* are used in a variety of ways throughout the northwest Amazon. The Kofan use the pulp of a related species, *S. mammosum* L., to repel cockroaches. This practice is widely known, and it has been suggested that the insecticidal properties of the pulp and seeds should be investigated (Schultes 1982).

BIGNONIACEAE

Crescentia Cujete L. Sp. Pl. (1753) 626.

Collect.: Davis & Yost 1037.

Waorani Informant: Cénto (m). Downriver dialect: n.v. *owéwé*

The fruits of this cultivated tree are used to make kapok (*Ceiba pentandra*) holders, drinking bowls and water containers, as well as the covers for the top and bottom of the dart quivers.

Mansoa Standleyi (Steyermark) Gentry.

Collect.: Davis & Yost 1035.

Waorani Informant: Cento (m). Downriver dialect: n.v. *wiyagɛi*

The leaves and stems of this liana are extremely pungent, and the Waorani use them to treat fever, sore muscles and arthritic ailments. The leaves are crushed in hot water, and the decoction is drunk or applied topically to the afflicted area. When taken in large amounts, the decoction causes vomiting.

Minquartia guianensis Aubl. in Hist. Pl. Gui. Franç. 2 (1775) 4.

Collect.: Davis & Yost 1002.

Waorani Informant: Tomo (m). Upriver dialect: n.v. *cobacadewɛ*

The bark of this 12 m. forest tree is stripped, pounded, and swished in water as a fish poison. The Waorani value the wood in house construction.

ACANTHACEAE

Ruellia colorata Baill. in Bull. Soc. Linn. Paris, 2 (1890) 853.

Collect.: Davis & Yost 1025.

Waorani Informant: Cento (m). Downriver dialect: n.v. *ɛwɛ-moya*

The bright, highly conspicuous inflorescences are placed as adornments in armbands during festivals.

RUBIACEAE

Alibertia cf. **edulis** (L. Rich) A. Rich in Mem. Soc. Hist. Nat. Par. 5 (1830) 234. t. 21.

Collect.: Davis & Yost 1046.

Waorani Informant: Tomo (m). Upriver dialect: n.v. *owɛcawɛ*

The Waorani employ the fruit of this small tree as a substitute for *Crescentia Cujete*. The fruit may be used as a bowl, a water container, to cover the dart quivers, or to carry kapok.

Calycophyllum acreanum Ducke in Archiv. Inst. Biol. Veg. Rio de Janeiro 2 (1935) 70.

Collect.: Davis & Yost 1041.

Waorani Informant: Tomo (m). Upriver dialect: n.v. *ooꝑowɛ*

The bark of this 60 m. tree of the primary forest is shaved off to prepare a decoction for treating fungal infections.

Coussarea brevicaulis Karuase in Verh. Bot. Ver. Brand. 1903, 1 (1909) 117.

Collect.: Davis & Yost 936.

Waorani Informant: Geque (m). Downriver dialect: n.v. *oman-como*

The yellow fruits of this small tree are edible. The Waorani recognize that many animals also eat the fruit: especially the squirrel monkey (*Saimiri sciurea*), the pygmy marmoset (*Cebuella pygmaea*), the capuchin monkey (*Cebus albifrons*), the tamarin monkey (*Saguinus fuscicollis*), the red titi (*Callicebus moloch*), and the woolly monkey (*Lagothrix lagotricha*).

Duroia hirsuta K. Schum. in Mart., Fl. Bras. 6: 6 (1889) 367.

Collect.: Davis & Yost 966.

Waorani Informant: Tomo (m). Upriver dialect: n.v. *owɛcawɛ*

This treelet is an abundant myrmecophyte of the primary rain forest. The Waorani break open the swollen stems that house the ants and apply the tissue and the concentrated pheromones directly to the inside of the cheek to relieve the pain that results from excessive use of the blowgun.

The Kofan use the leaves of an unidentified species of *Duroia* in a cold water infusion to treat coughs (Schultes in prep.).

Pentagonia parvifolia Steyerem. in Acta Biol. Venez. 4 (1964) 232.

Collect.: Davis & Yost 969.

Waorani Informant: Tomo (m). Upriver dialect: n.v. *boyomo*

The Waorani eat the fruit of this 30 m. forest tree and report that all forest animals also consume the fruit.

The Kofan Indians take the pulp from around the seeds of an unidentified species of *Pentagonia* and place it in cuts to prevent infection (Schultes in prep.).

Pentagonia spathicalyx K. Schum. in Martius, Fl. Bras. 6, pt. 6 (1889) 302.

Collect.: Davis & Yost 942, 971.

Waorani Informant: Geque (m). Downriver dialect: n.v. *boyomo*

Known as *boyomo*, "the sting ray leaf" because the broad leaf looks like a sting ray, this forest tree gives an edible fruit applied to treat sting ray wounds—the most painful of all jungle afflictions.

Simira sp.

Collect.: Davis & Yost 1007.

Waorani Informant: Tomo (m). Upriver dialect: n.v. *wepeta*

The bark of this tall (70 m.) forest tree oxidizes to a brilliant red and is used as a dye by the Waorani. Shavings are soaked overnight and boiled the next day to yield the red dye for infant-carrying slings, baskets, hammocks and fishnets.

CUCURBITACEAE

Cayaponia Ruizii Cogn. in DC., Monog. Phan. 3 (1881) 794.

Collect.: Davis & Yost 959.

Waorani Informant: Geque (m). Downriver dialect: n.v. *cagi-wēnca*

The Waorani eat the seed of this liana, and hunters recognize that it is a preferred food of the toucan (*Ramphosto cuvieri*), the chestnut fronted macaw (*Ara severa*), the scarlet macaw (*Ara macao*), and the woolly monkey (*Lagothrix lagotricha*).

Although the Waorani do not consider this plant medicinal, the Kofan Indians burn the stems and apply the ashes of an unidentified species of *Cayaponia* to external sores to hasten healing (Schultes 1982). Indians of the Rio Apaporis in Colombia use the green bark of *Cayaponia ophthalmica* R.E. Schult. to prepare a wash to treat conjunctivitis. The Tikuna of the Rio Loretoyacu of Colombia dry and powder the leaves of *Cayaponia glandulosa* Cogn. to prepare an insect repellent for use in hammocks and clothes (Schultes in prep.).

COMPOSITAE

Clibadium asperum DC., Prodr. 5 (1836) 506.

Collect.: Davis & Yost 924.

Waorani Informant: Taade (m). Ridge dialect: n.v. *coonei*

The Waorani use the crushed leaves of this cultivated shrub as a very effective fish poison. Fifteen pounds of crushed leaves released into a stream 0.5 m. deep and 5 m. wide will stun the fish in a full kilometer downstream; when cast into a small oxbow lake, the plant material is effective for three to four hours. The Indians assert that this was not a fish poison of the ancestors, but that they received it from their neighbors, the Lowland Quichua.

This species is known throughout the northwest Amazon as a fish poison.

FAMILY UNDETERMINED

Collect.: Davis & Yost 950.

Waorani Informant: Geque (m). Downriver dialect: n.v. *mé-netadé*

This unidentified forest liana has a star-shaped fruit with yellow seeds covered by an orange aril. The latex of the stem is applied to the exposed nerve of a decayed tooth to deaden the pain.

Collect.: Davis & Yost 996.

Waorani Informant: Oncaye (f). Downriver dialect: n.v. *contaca*

The fruits of this 25 m. tree of the forest have a yellow rind and white flesh; the pulp is eaten.

Collect.: Davis & Yost 1042.

Waorani Informant: Tomo (m). Upriver dialect: n.v. *anawénta*

The Waorani shave the inner bark of this 60 m. forest tree and squeeze the shavings in water mixed with *Bixa Orellana* pulp to brighten the color from dull to bright orange.

Collect.: Davis & Yost 1050.

Waorani Informant: Tomo (m). Upriver dialect: n.v. *quiguiwai*

The ancestors of the Waorani mixed various species of epiphytic bryophytes with *Dictyonema sp. nov.* (Davis 1051) to prepare an hallucinogenic drink. The generic terms for mosses is *quiguiwai*.

ooo

UNIDENTIFIED WAORANI PLANT NAMES

- a) *Dabétawé* — the bark of this tree is valued as a fungicide.
- b) *Omeogo* — the inner cambium of this tree is harvested for bark cloth.
- c) *Tanemo* — a liana that produces an edible tuber like the sweet potato.
- d) *Titéquewe* — The “wild” form of yuca used by the ancestors.
- e) *Winca* — A shrub to small tree which is the source of a blue-black dye, similar to *Genipa sp.*

LITERATURE CITED

- Acro Duarte, L. E. 1979. *Principales Plantas Utiles de la Amazonia Colombiana*. Instituto Geografico “Augustin Codazzi”, Bogotá. p. 139.
- Altschul, S. Von R. 1973. *Drugs and Foods from Little-Known Plants*. Harvard University Press, Cambridge, Ma. 1973. pp. 198, 36, 55.
- Bailey, L. H. 1976. *Hortus Third*. MacMillan Publishing Co., N.Y., N.Y., p. 184.
- Black, F. L. 1975. Infectious disease in primitive societies. *Science* vol. 187. pp. 515-518.
- Davis, E. Wade and James A. Yost, in press. The Ethnomedicine of the Waorani. *Journal of Ethnopharmacology*.
- , in press. Novel Hallucinogens from Eastern Ecuador. *Botanical Museum Leaflets. Harvard Univ.*
- Duke, J. 1972. *Isthmian Ethnobotanical Dictionary*, Fulton, Maryland, p. 5.
- Fanshawe, D. 1950. Forest Products of British Guiana. Part II. *Forestry Bulletin No. 2 (New Series)*, Forest Department, British Guiana, p. 44.
- Garcia-Barriga, H. 1974. *Flora Medicinal de Colombia*. Instituto de Ciencias Naturales, Universidad Nacional, Bogotá, Colombia. vol. 1, pp. 140, 144, 273.
- . 1975. *Flora Medicinal de Colombia*. Instituto de Ciencias Naturales, Universidad Nacional, Bogotá, vol. 2, p. 69.

- Holmstedt, B., J. E. Lindgren, T. Plowman, L. Rivier, R. E. Schultes, O. Tovar. 1980. Indole Alkaloids in Amazonian *Myristicaceae*: Field and laboratory research, *Botanical Museum Leaflets, Harvard University*, vol. 28, no. 3, pp. 215-234.
- Kaplan, J. E., J. W. Larrick, J. A. Yost, L. Farrell, H. B. Greenberg, K. L. Herrmann, A. J. Sulzer, K. W. Walls, L. Pederson. 1980. Infectious disease pattern in the Waorani, an isolated Amerindian population, *American Journal of Tropical Medicine and Hygiene*, vol. 29, no. 2, pp. 298-312.
- Larrick, J. W., J. A. Yost, and J. Kaplan. 1978. Snakebite among the Waorani Indians of eastern Ecuador. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, vol. 72, no. 5, pp. 542-543.
- Larrick, J. W., J. A. Yost, J. Kaplan, G. King and J. Mayhall. 1979. Patterns of Health and Disease Among the Waorani Indians of Eastern Ecuador. *Medical Anthropology*, vol. 3, no. 2, pp. 147-191.
- New York Times*. 1956. Five U.S. Missionaries Believed Slain, January 13, p. 2.
- Peeke, M. C. 1973. *Preliminary Grammar of Auca*, The Summer Institute of Linguistics, Norman, Oklahoma, p. 4.
- Pereira, H. 1929. *Pequena Contribução para um Dicionário das Plantas Úteis do Estado de São Paulo*, Typographia Brasil de Rothschild e Co., São Paulo, p. 256.
- Perez Arbeláez, E. 1956. *Plantas Útiles de Colombia*, Sucesores de Rivadeneira, Madrid, p. 575.
- Pinkley, H. V. 1973. *The Ethno-ecology of the Kofan*. Doctoral Dissertation, Harvard University.
- Pio Correa, M. 1926. *Dicionário das Plantas Úteis do Brasil e das Exóticas Cultivadas*. Imprensa Nacional, Rio de Janeiro, p. 329.
- Plowman, T. 1977. Brunfelsia in Ethnomedicine. *Botanical Museum Leaflets, Harvard University*, vol. 25, no. 10, pp. 289-320.
- Schultes, R. E. 1942a. *Plantae Colombianae II. Yoco: a stimulant of southern Colombia*. *Botanical Museum Leaflets, Harvard University*, vol. 10, no. 10, pp. 301-324.
- . and Hofmann, A. 1980. *The Botany and Chemistry of Hallucinogens*, Charles C. Thomas, Springfield, Ill., ed. 2, pp. 125-126.
- . and Holmstedt, B. 1971. Miscellaneous notes on myristicaceous plants of South America, *Lloydia*, vol. 34, no. 1, pp. 61-78.
- . *Ethnopharmacology of the Northwest Amazon*, unpublished manuscript.
- Theakston, R. D. G., H. A. Reid, J. W. Larrick, J. Kaplan, and J. A. Yost. 1981. Snake venom antibodies in Ecuadorian Indians, *Journal of Tropical Medicine and Hygiene*, vol. 84, pp. 199-202.
- Usher, G. 1974. *Dictionary of Plants Used by Man*, Hafner Press, New York, pp. 68, 126, 133, 326, 592, 500.
- Wallis, E. E. 1973. *Aucas Downriver*, Harper and Row, New York.
- Yost, J. A. 1981. People of the Forest: The Waorani, in *Ecuador: In the Shadow of the Volcanoes*. Quito, Ecuador, Ediciones Libri Mundi, pp. 96-115.

- Yost, J. A. 1981. Twenty Years of Contact: The Mechanisms of Change in Wao ("Auca") Culture, in Norman E. Whitten, Jr. (ed.) *Cultural Transformations and Ethnicity in Modern Ecuador*, Urbana, University of Illinois Press, pp. 677-704.
- Yost, J. A. and Patricia M. Kelley. 1983. Shotguns, Blowguns, and Spears: The Analysis of Technological Efficiency, in Hames and Vickers (eds.), *Adaptive Responses of Native Amazonians*, New York, Academic Press, pp. 189-224.

PLATE 20

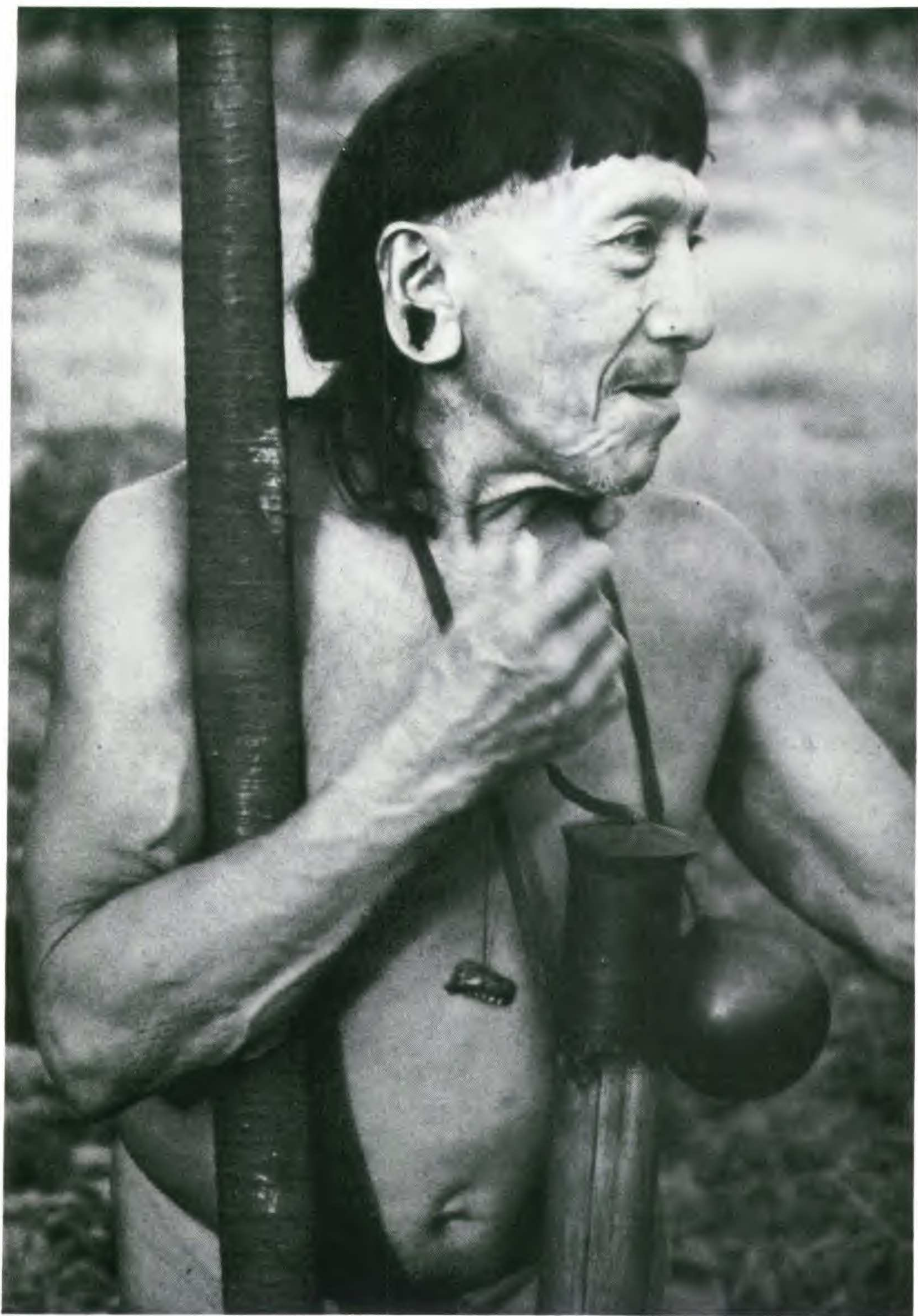


Plate 20. Waorani hunter, aged approximately 75. Note dart quiver, gourd containing kapok fiber, and piranha jaw for notching darts. Photograph by E.W. Davis.

PLATE 21



Plate 21. Fishing with meneco (*Lonchocarpus Nicou* (Aubl.) DC. var. *Urucu* Killip & Smith. Photograph by E.W. Davis.

PLATE 22

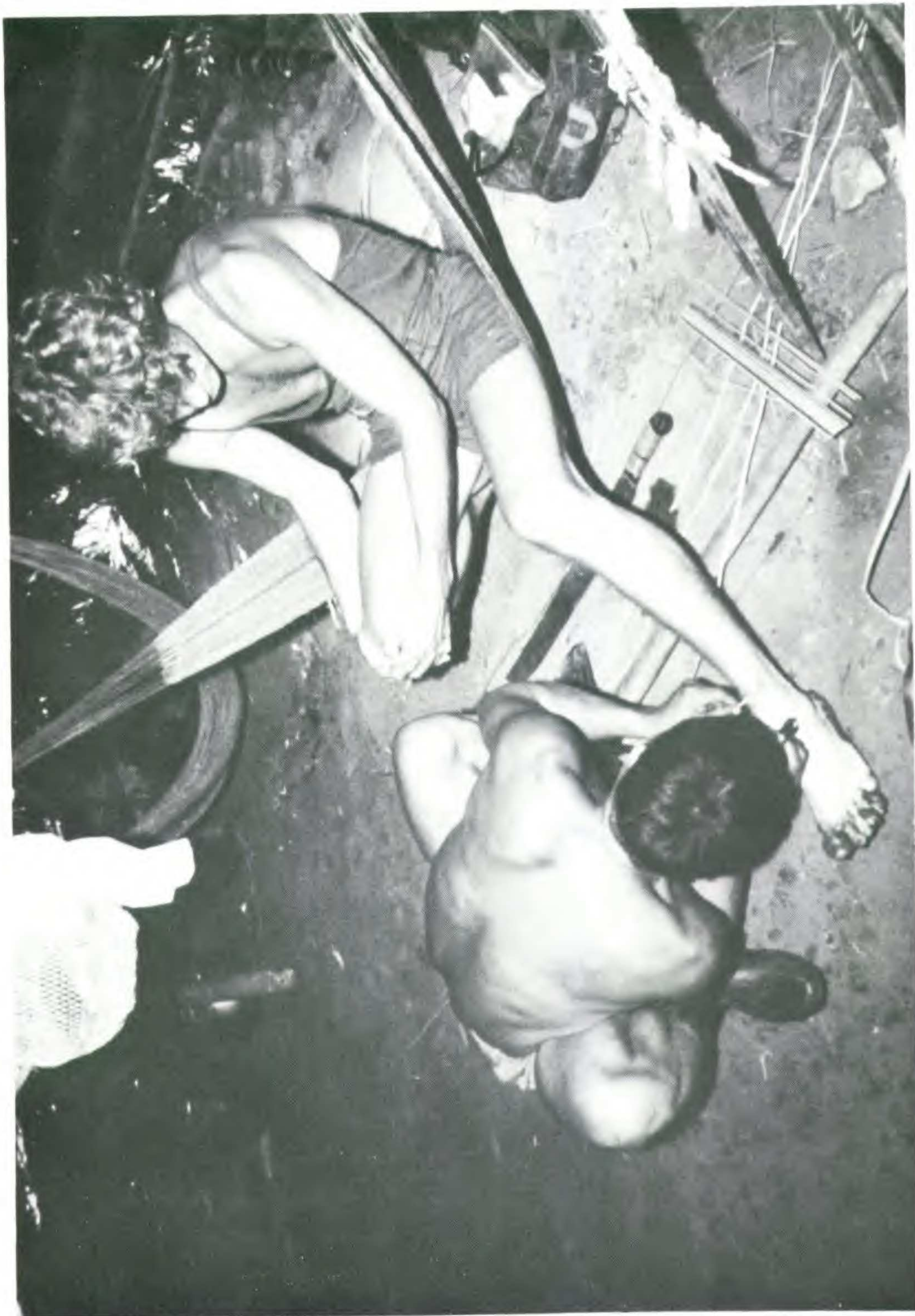


Plate 22. Treating one authors' infection with oonta (*Curarea tecunarium* Barn. et Druk.). Photograph by E. W. Davis.

PLATE 23



Plate 23. Kowé, Jaguar shaman drying the poison darts. To the left, supported by two hunting spears, is the filter for producing the poison. Photograph by E.W. Davis.

PLATE 24

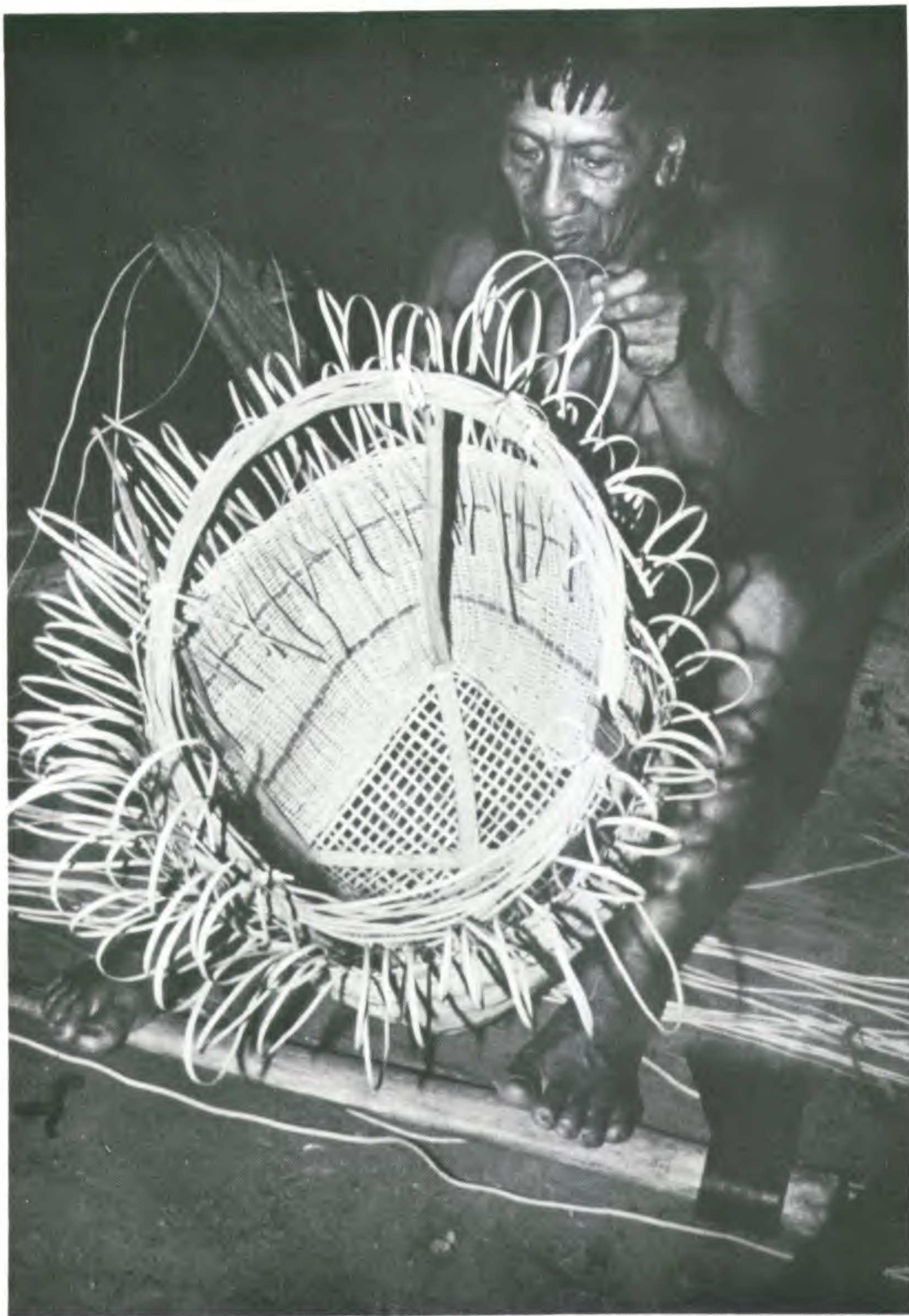


Plate 24. Weaving baskets with otame (*Heteropsis sp.*). Photograph by E.W. Davis.

PLATE 25



Plate 25. Weaving a hammock with chambira fiber (*Astrocaryum Chambira* Burret) Note the raw fiber on the ground. Photograph by E.W. Davis.